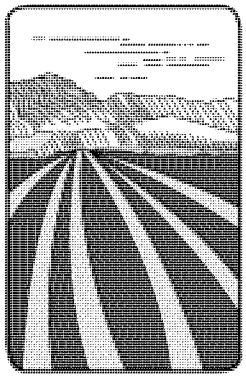

Oregon
Department
of Agriculture

Southern Willamette Valley Agricultural Water Quality Management Area Plan

Developed by the:

Southern Willamette Valley Local Advisory Committee

Oregon Department of Agriculture

With support from the:

Upper Willamette Soil and Water Conservation District
(Note: only ODA & LAC have statute authority to write the plan)

Date:

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Table of Contents

ED_454-000322884 EPA-6822_012387

ED_454-000322884 EPA-6822_012388

ED_454-000322884 EPA-6822_012389

Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendment
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
Regulations – Agricultural Water Quality Management Area Regulations
RUSLE – Revised Universal Soil Loss Equation
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
WQPMT – Water Quality Pesticides Management Team

ED_454-000322884 EPA-6822_012390

Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Agricultural Water Quality Management Area (Management Area). The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, compliance, and monitoring.

The provisions of this Area Plan do not establish legal requirements or prohibitions, as described in Oregon Revised Statute (ORS) 568.912(1).

Required Elements of Area Plans

Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality, as required by state and federal law (Oregon Administrative Rule (OAR) 603-090-0030(1)). At a minimum, an Area Plan must:

- Describe the geographical area and physical setting of the Management Area.
- List water quality issues of concern.
- List impaired beneficial uses.
- State that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Include water quality objectives.
- Describe pollution prevention and control measures deemed necessary by the Oregon Department of Agriculture (ODA) to achieve the goal.
- Include an implementation schedule for measures needed to meet applicable dates established by law.
- Include guidelines for public participation.
- Describe a strategy for ensuring that the necessary measures are implemented.

Plan Content

Chapter 1: Agricultural Water Quality Management Program Purpose and Background. The purpose is to have consistent and accurate information about the Agricultural Water Quality Management Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, regulations (Area Rules), and available or beneficial practices to address water quality issues.

Chapter 3: Local Goals, Objectives, and Implementation Strategies. Chapter 3 presents goal(s), measurable objectives and timelines, and strategies to achieve the goal(s) and objectives.

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. ODA and the Local Advisory Committee (LAC) will work with partners to summarize land condition and water quality status. Trends are summarized to assess progress toward the goals and objectives in Chapter 3.

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ED_454-000322884 EPA-6822_012392

Chapter 1: Agricultural Water Quality Management Program Purpose and Background

1.1 Purpose of Agricultural Water Quality Management Program and Applicability of Area Plans

As part of Oregon's Agricultural Water Quality Management Program (Ag Water Quality Program), this Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing local agricultural water quality issues. The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) on agricultural and rural lands for the area within the boundaries of the Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). This Area Plan has been developed and revised by ODA, the LAC, with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). Throughout the development and revision processes, the public was invited to participate. This included public comment at meetings and public hearings during the Area Plan approval process. This Area Plan is implemented using a combination of outreach and education, conservation and management activities, compliance, monitoring, evaluation, and adaptive management.

The provisions of this Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)). Each Area Plan is accompanied by OAR regulations that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OARs 603-090-0000 to 603-090-0120) and under the regulations for this Management Area (OARs 603-095-2100). The Ag Water Quality Program's general OARs guide the Ag Water Quality Program, and the OARs for the Management Area are the regulations that landowners must follow.

This Area Plan and its associated regulations apply to all agricultural activities on non-federal and non-Tribal Trust land within the Management Area, including:

- Large commercial farms and ranches.
- Small rural properties grazing a few animals or raising crops.
- Agricultural lands that lay idle or on which management has been deferred.
- Agricultural activities in urban areas.
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).

ED_454-000322884 EPA-6822_012393

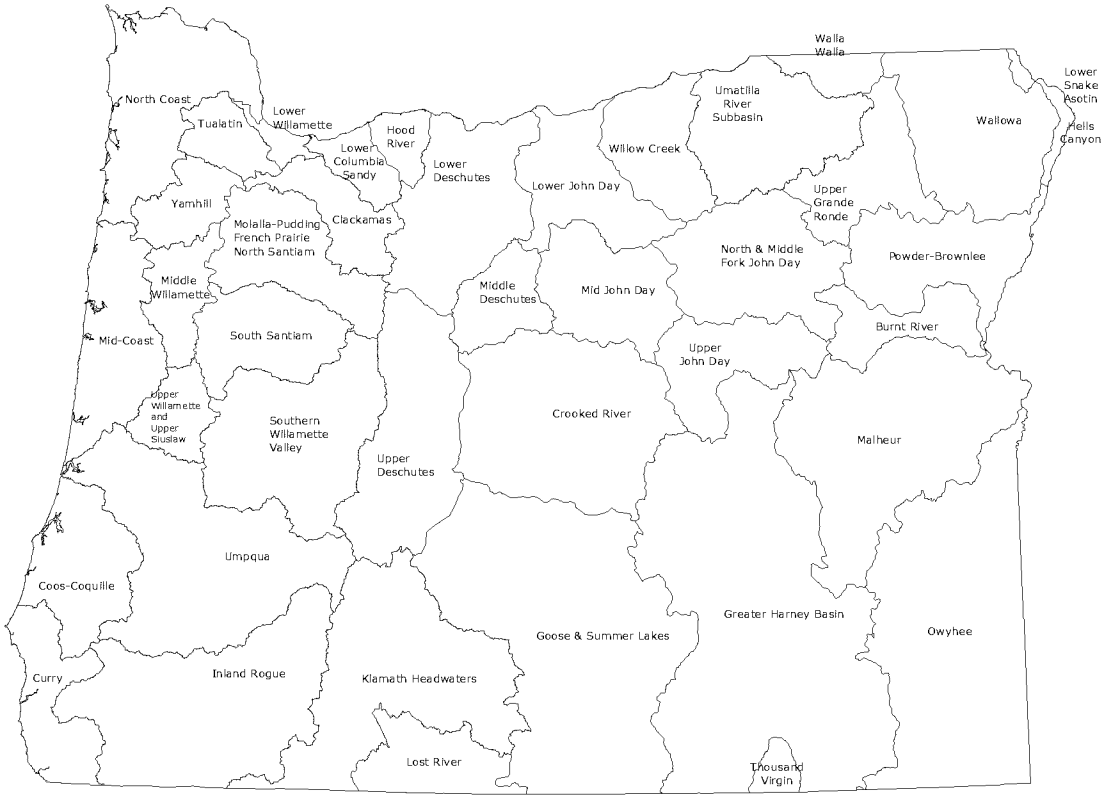
1.2 History of the Ag Water Quality Program

In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act, directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion, and to achieve water quality standards (ORS 568.900 through ORS 568.933). Senate Bill 502 was passed in 1995 to clarify that ODA regulates agriculture with respect to water quality (ORS 561.191). This Area Plan and its associated regulations were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and associated regulations in 38 watershed-based Management Areas across Oregon (Figure 1). Since 2004, ODA, LACs, SWCDs, and other partners have focused on implementation, including:

- Providing education, outreach, and technical assistance to landowners.
- Implementing projects to improve agricultural water quality.
- Investigating complaints of potential violations of regulations.
- Conducting biennial reviews of Area Plans and regulations.
- Monitoring, evaluation, and adaptive management.
- Developing partnerships with SWCDs, state, federal, and tribal agencies, watershed councils, and others.

Figure 1: Map of 38 Agricultural Water Quality Management Areas



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1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture (ODA)

ODA is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program is intended to meet the needs and requirements related to agricultural water pollution, including:

- State water quality standards.
- Load allocations for agricultural nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the Clean Water Act (CWA), Section 303(d).
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if a GWMA has been established and an Action Plan developed).

ODA has the legal authority to develop and implement Area Plans and associated regulations for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). ODA will base Area Plans and regulations on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and associated regulations. ODA has responsibility for any actions related to enforcement or determination of noncompliance with regulations (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give authority to ODA to adopt regulations that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The emphasis of this Area Plan is on voluntary action by landowners or operators to control the factors effecting water quality in the Management Area. The regulations are outlined as a set of minimum standards that must be met on all agricultural or rural lands. Landowners and operators who fail to address these regulations may be subject to enforcement procedures, which are outlined below.

Enforcement Action—ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with water quality regulations. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed. If a violation is documented, ODA may issue a pre-enforcement notification or an Order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, the landowner or operator will be directed by ODA to remedy the condition through required corrective actions under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the required corrective actions, civil penalties may be assessed for continued violation of the regulations. See the Compliance Flow Chart for a diagram of the compliance process. If and when other governmental policies, programs, or regulations conflict with this Area Plan or associated regulations, ODA will consult with the agency(ies) and attempt to resolve the conflict in a reasonable manner.

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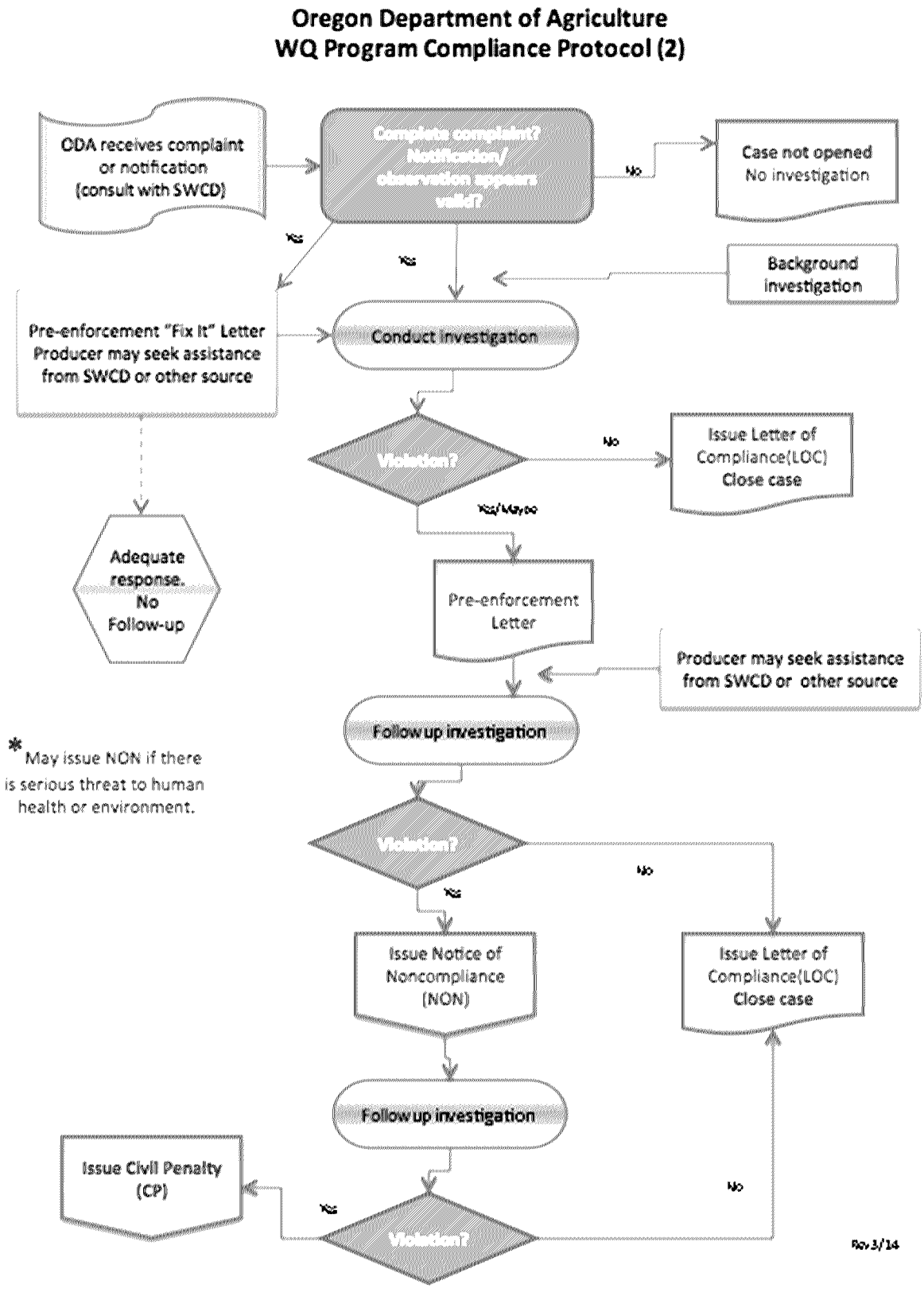
Figure 2: Compliance Flow Chart



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1.3.2 Local Management Agency

A Local Management Agency is an organization that ODA has designated to implement an Area Plan (OAR 603-090-0010). The legislative intent is for SWCDs to be Local Management Agencies to the fullest extent practical, consistent with the timely and effective implementation of Area Plans (ORS 568.906). SWCDs have a long history of effectively assisting landowners who voluntarily address natural resource concerns. Currently, all Local Management Agencies in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an intergovernmental agreement between ODA and each SWCD. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and associated regulations as needed.

1.3.3 Local Advisory Committee (LAC)

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members, to assist with the development and subsequent biennial reviews of the local Area Plan and regulations. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are composed primarily of landowners in the Management Area and must reflect a balance of affected persons.

The LAC may meet as frequently as necessary to carry out their responsibilities, which include, but are not limited to:

- Participate in the development and ongoing revisions of the Area Plan.
- Participate in the development and revisions of regulations.
- Recommend strategies necessary to achieve goals and objectives in the Area Plan.
- Participate in biennial reviews of the progress of implementation of the Area Plan and regulations.
- Submit written biennial reports to the Board of Agriculture and the ODA director.

1.3.4 Agriculture's Role

Each individual landowner or operator in the Management Area is required to comply with the regulations, which set minimum standards. However, the regulations alone are not enough. To achieve water quality standards, individual landowners also need to attain land conditions that achieve the goals and objectives of the voluntary Area Plan. Each landowner or operator is not individually responsible for achieving water quality standards, agricultural pollution limits, or the goals and objectives of the Area Plan. These are the responsibility of the agricultural community collectively.

Technical and financial assistance is available to landowners who want to work with SWCDs (or with other local partners) to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance.

Area regulations only address impacts that result from agricultural activities. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Conditions resulting from unusual weather events or other circumstances not within the reasonable control of the landowner or operator are considered when making compliance decisions. Agricultural landowners may be responsible for some of the above impacts under other legal authorities.
Under the Area Plan and associated regulations, agricultural landowners and operators are not responsible for mitigating or addressing factors that do not result from agricultural activities, such as:

ED_454-000322884 EPA-6822_012397

- Hot springs, glacial melt water, extreme or unforeseen weather events, and climate change.
- Septic systems and other sources of human waste.
- Public roadways, culverts, roadside ditches and shoulders.
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments.
- Housing and other development in agricultural areas.

1.3.5 Public Participation

The public was encouraged to participate when ODA, LACs, and SWCDs initially developed the Area Plans and associated regulations. ODA and the LAC in each Management Area, held public information meetings, a formal public comment period, and a formal public hearing. ODA and the LACs modified the Area Plans and regulations, as needed, to address comments received. The director of ODA adopted the Area Plans and regulations in consultation with the Board of Agriculture.

ODA, LACs, and SWCDs conduct biennial reviews of the Area Plans and regulations. Partners, stakeholders, and the general public are invited to participate in the process. Any future revisions to the regulations will include a public comment period and a public hearing.

1.4 Agricultural Water Quality

1.4.1 Point and Nonpoint Sources of Water Pollution

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. Significant point sources are required to obtain permits that specify their pollutant limits. Agricultural operations regulated as point sources include permitted Confined Animal Feeding Operations (CAFOs) and pesticide applications in, over and within three feet of water. Many CAFOs are regulated under ODA's CAFO Program. Irrigation water discharges may be at a defined discharge point, but does not currently require a permit.

Nonpoint water pollution originates from the general landscape and is difficult to trace to a single source. Nonpoint sources include erosion and contaminated runoff from agricultural and forest lands, urban and suburban areas, roads, and natural sources. In addition, groundwater can be impacted from nonpoint sources including agricultural amendments (fertilizers and manure).

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses of clean water include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, and commercial navigation and transportation. The most sensitive beneficial uses are usually fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses are generally the first to be impaired as a water body is polluted, because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impacted in this Management Area are summarized in Chapter 2.

Many water bodies throughout Oregon do not meet state water quality standards. These water bodies may or may not have established water quality management plans documenting needed reductions. The most common water quality concerns related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, algae, pH, dissolved oxygen, harmful algal blooms, nitrates, pesticides, and mercury. These parameters vary by Management Area and are summarized in Chapter 2.

ED_454-000322884 EPA-6822_012398

1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs)

Every two years, the DEQ is required by the federal Clean Water Act (CWA) to assess water quality in Oregon. CWA Section 303(d) requires DEQ to identify a list of waters that do not meet water quality standards. The resulting list is commonly referred to as the 303(d) list. DEQ, in accordance with the CWA, is required to establish TMDLs for pollutants on the 303(d) list.

A TMDL includes an assessment of water quality data and current conditions and describes a plan to restore polluted waterways to conditions that meet water quality standards. TMDLs specify the daily amount of pollution that a water body can receive and still meet water quality standards. Through the TMDL, point sources are assigned pollution limits as "waste load allocations" in permits, while nonpoint sources (agriculture, forestry, and urban) are assigned pollution limits as "load allocations." TMDLs are legal orders issued by the DEQ, so parties assigned waste or load allocations are legally required to meet them. The agricultural sector is responsible for meeting the pollution limit (load allocation) assigned to agriculture specifically, or to nonpoint sources in general, as applicable.

TMDLs generally apply to an entire basin or subbasin, and not just to an individual water body on the 303(d) list. Once a TMDL is developed for a basin, the basin's impaired water bodies are removed from the 303(d) list, but they remain on the list of impaired water bodies. When data show that water quality standards have been achieved, water bodies will be identified on the list of water bodies that are attaining water quality standards.

As part of the TMDL process, DEQ identifies the Designated Management Agency or parties responsible for submitting TMDL implementation plans. TMDLs designate that the local Area Plan is the implementation plan for the agricultural component of the TMDLs that apply to this Management Area. Biennial reviews and revisions to the Area Plan and regulations must address agricultural or nonpoint source load allocations from TMDLs.

The list of impaired water bodies (303(d) list), the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.

1.4.4 Water Pollution Control Law – ORS 468B.025 and ORS 468B.050

Senate Bill 502 was passed in 1995, authorizing ODA as the state agency responsible for regulation of farming activities for the purpose of protecting water quality. A Department of Justice opinion dated July 10, 1996, states that "...ODA has the statutory responsibility for developing and implementing water quality programs and rules that directly regulate farming practices on exclusive farm use and agricultural lands." In addition, this opinion states, "The program or rule must be designed to achieve and maintain Environmental Quality Commission's water quality standards."

To implement Senate Bill 502, ODA incorporated ORS 468B into all of the Area Plans and associated regulations in the state. A Department of Justice opinion, dated September 12, 2000, clarifies that ORS 468B.025 applies to point and nonpoint source pollution.

ED_454-000322884 EPA-6822_012399

ORS 468B.025 states that:

"(1) ...no person shall:

(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050."

The aspects of ORS 468B.050 that apply to the Ag Water Quality Program, state that:

"(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:

(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system."

Definitions (ORS 468B.005)

"Wastes" means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances, which will or may cause pollution or tend to cause pollution of any waters of the state. Additionally, OAR 603-095-0010(53) includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials, or any other wastes.

"Pollution or water pollution" means such alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.

"Water" or "the waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or affect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control agricultural water pollution. Streamside vegetation provides three primary water quality functions: shade for cooler stream temperatures, streambank stability, and filtration of pollutants. Other water quality functions include: water storage for cooler and later season flows, sediment trapping that builds streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides.

Additional reasons for the Ag Water Quality Program's emphasis on streamside vegetation include:

ED_454-000322884 EPA-6822_012400

- Streamside vegetation improves water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation provides fish and wildlife habitat.
- Landowners can improve streamside vegetation in ways that are compatible with their operation.
- Streamside vegetation condition can be monitored readily to track the status and trends of agriculture's progress in addressing water quality concerns.

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streams can provide to protect water quality. Site-capable vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods) and historical and current human influences (e.g., channelization, roads, invasive species, modified flows, past land management). Site-capable vegetation can be determined for a specific site based on: current streamside vegetation at the site, streamside vegetation at nearby reference sites with similar natural characteristics, NRCS soil surveys, and local or regional scientific research.

The goal for Oregon's agricultural landowners is to provide the water quality functions (e.g., shade, streambank stability, and filtration of pollutants) produced by site-capable vegetation along all streams flowing through agricultural lands. The agricultural water quality regulations for each Management Area require that agricultural activities provide water quality functions consistent with what the site would provide with site-capable vegetation.

In some cases, for narrow streams, mature site-capable vegetation may not be needed. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature vegetation is important. Limited exceptions include:

- Junipers are mature site-capable vegetation in central and eastern Oregon, but they reduce bank stability and increase erosion,
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality.

1.5 Other Water Quality Programs

1.5.1 Confined Animal Feeding Operation (CAFO)

ODA is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators and producers do not contaminate ground or surface water with animal manure. Since the early 1980s, CAFOs have been registered to a general Water Pollution Control Facility permit designed to protect water quality, while allowing the operators and producers to remain economically viable. A properly maintained CAFO does not pollute ground or surface water. To assure continued protection of ground and surface water, ODA was directed by the 2001 Oregon State Legislature to convert the CAFO Program from a Water Pollution Control Facility permit program to a federal National Pollutant Discharge Elimination System (NPDES) program. ODA and DEQ jointly issued a NPDES CAFO Permit in 2003 and 2009. The 2009 permit will expire in May 2014, and it is expected that a new permit will be issued at that time. The NPDES CAFO Permit is compliant with all Clean Water Act requirements for CAFOs; it does allow discharge in certain circumstances as long as the discharge does not violate Water Quality Standards.

Oregon NPDES CAFO Permits require the registrant to operate according to a site-specific, ODA approved, Animal Waste Management Plan that is incorporated into the NPDES CAFO Permit by reference. CAFO NPDES Permits protect both surface and ground water resources.

ED_454-000322884 EPA-6822_012401

1.5.2 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and the Oregon Health Authority encourage community-based protection and preventive management strategies to ensure that all public drinking water resources are kept safe from future contamination. For more information see: www.deq.state.or.us/wq/dwp/dwp.htm. Agricultural activities are required to meet those water quality standards that contribute the safe drinking water.

1.5.3 Groundwater Management Areas (GWMAs)

Groundwater Management Areas are designated by DEQ when groundwater in an area has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. Once the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is formed. The committee then works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

Oregon has designated three GWMAs because of elevated nitrate concentrations in groundwater. These include the Lower Umatilla Basin GWMA, the Northern Malheur County GWMA, and the Southern Willamette Valley GWMA. Each GWMA has a voluntary Action Plan to reduce nitrate concentrations in groundwater. If after a scheduled evaluation point DEQ determines that the voluntary approach is not effective, then mandatory requirements may become necessary.

1.5.4 Pesticide Management and Stewardship

The ODA Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon, under the Federal Insecticide Fungicide Rodenticide Act. ODA's Pesticide Program administers regulations relating to pesticide sales, use, and distribution, including pesticide operator and applicator licensing, as well as proper application of pesticides, pesticide labeling, and registration.

In 2007, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from ODA, Oregon Department of Forestry, DEQ, and the Oregon Health Authority. The WQPMT facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT relies on monitoring data from the Pesticides Stewardship Partnership (PSP) Program and other monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections can be addressed through multiple programs and partners, including the PSP Program described above.

Through the PSP Program, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (www.deq.state.or.us/wq/pesticide/pesticide.htm). DEQ, ODA, and Oregon State University Extension Service work with landowners, SWCDs, watershed councils, and other local partners to voluntarily reduce pesticide levels while improving water quality and crop management. There has been noteworthy progress since 2000 in reducing pesticide concentrations and detections.

ODA led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon (www.oregon.gov/ODA/PEST/water_quality.shtml). The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources,

ED_454-000322884 EPA-6822_012402

and preventing human disease. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by the U.S. EPA and Oregon in both agricultural and non-agricultural settings.

1.5.5 The Oregon Plan for Salmon and Watersheds

In 1997, Oregonians began implementing the Oregon Plan for Salmon and Watersheds referred to as the Oregon Plan (www.oregon-plan.org). The Oregon Plan seeks to restore native fish populations, improve watershed health, and support communities throughout Oregon. The Oregon Plan has a strong focus on salmon, because they have such great cultural, economic, and recreational importance to Oregonians, and because they are important indicators of watershed health. ODA's commitment to the Oregon Plan is to develop and implement Area Plans and associated regulations throughout Oregon.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality (DEQ)

The U.S. EPA has delegated authority to DEQ under the CWA authority for protection of water quality in Oregon. In turn, DEQ is the lead state agency with overall authority to regulate for water quality in Oregon. DEQ coordinates with other state agencies, including ODA and Oregon Department of Forestry, to meet the needs of the CWA. DEQ sets water quality standards and develops TMDLs for impaired waterbodies. In addition, DEQ develops and coordinates programs to address water quality including National Pollution Discharge Elimination Permits (for point sources), 319 program, Source Water Protection, 401 Water Quality Certification, and GWMAs. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans as part of its 319 program.

DEQ designated ODA as the Designated Management Agency for water pollution control activities on agricultural and rural lands in the state of Oregon to coordinate meeting agricultural TMDL load allocations. A Memorandum of Agreement (MOA) between DEQ and the ODA recognizes that ODA is the agency responsible for implementing the Ag Water Quality Program established under ORS 568.900 to ORS 568.933, ORS 561.191, and OAR Chapter 603, Divisions 90 and 95. The MOA between ODA and DEQ was updated in 2012 and describes how the agencies will work together to meet agricultural water quality requirements.

The MOA includes the following commitments:

- ODA will develop and implement a monitoring strategy, as resources allow, in consultation with DEQ.
- ODA will evaluate Area Plans and regulation effectiveness in collaboration with DEQ.
    - ODA will determine the percentage of lands achieving compliance with Management Area regulations.
    - ODA will determine whether the target percentages of lands meeting the desired land conditions, as outlined in the goals and objectives of the Area Plans, are being achieved.
- ODA and DEQ will review and evaluate existing information with the objective of determining:
    - Whether additional data are needed to conduct an adequate evaluation.
    - Whether existing strategies have been effective in achieving the goals and objectives of the Area Plan.
    - Whether the rate of progress is adequate to achieve the goals of the Area Plan.

The Environmental Quality Commission, which serves as DEQ's policy and rulemaking board, may petition ODA for a review of part or all of any Area Plan or its associated regulations. The petition must

ED_454-000322884 EPA-6822_012403

allege with reasonable specificity that the Area Plan or associated regulations are not adequate to achieve applicable state and federal water quality standards (ORS 568.930(3)(a)).

1.6.2 Other Partners

ODA and SWCDs work in close partnership with local, state, and federal agencies and organizations, including: DEQ (as indicated above), the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and Farm Service Agency, watershed councils, Oregon State University Extension Service, livestock and commodity organizations, conservation organizations, and local businesses. As resources allow, SWCDs and local partners provide technical, financial, and educational assistance to individual landowners for the design, installation, and maintenance of effective management strategies to prevent and control agricultural water pollution.

1.7 Measuring Progress

Agricultural landowners and operators have implemented effective conservation projects and management activities throughout Oregon to improve water quality for many years. However, it has been challenging for ODA, SWCDs, and LACs to measure this progress. ODA is working with SWCDs, LACs, and our partners to develop and implement objectives and strategies that will produce measurable outcomes for agricultural water quality.

1.7.1 Measurable Objectives

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and load allocations where TMDLs have been completed. Many of these measurable objectives relate to land condition and are mainly implemented through focused work in small geographic areas (section 1.7.3). The measurable objectives for this Area Plan are in Chapter 3, and progress toward achieving the objectives is summarized in Chapter 4.

At a minimum, the measurable objectives of the Ag Water Quality Program and this Area Plan are to:

- Increase the percentage of lands achieving compliance with the regulations.
- Increase the percentage of lands meeting desired land conditions outlined in the Area Plan.

1.7.2 Land Condition and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, streamside vegetation is generally used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and nutrients, because many pesticides and nutrients adhere to sediment particles.

The Ag Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over them.
- It can be difficult to separate agriculture's influence on water quality from other land uses.
- It requires extensive monitoring of water quality at an intensive temporal scale to evaluate progress; it is expensive and may fail to demonstrate short-term improvements.
- Improved land conditions can be documented immediately, but there may be a significant lag time or a need for more extensive implementation before water quality improves.
- Agricultural improvements in water pollution are primarily through improvements in land and management conditions.

ED_454-000322884 EPA-6822_012404

Water quality monitoring data may help ODA and partners to measure progress or identify problem areas in implementing the Area Plan; although, as described above, it may be less likely to evaluate the short-term effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides.

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with significant water quality or land condition concerns that are associated with agriculture. ODA's intent in selecting Focus Areas is to deliver systematic, concentrated outreach and technical assistance in small geographic areas ("Focus Areas") through the SWCDs. A key component of this approach is measuring conditions before and after implementation to document the progress made with available resources. The focused implementation approach is consistent with other agencies' and organizations' efforts to work proactively in small geographic areas, and is supported by a large body of scientific research (e.g., Council for Agricultural Science and Technology, 2012).

Systematic implementation in Focus Areas can provide the following advantages:

- Measuring progress is easier in a small watershed than across an entire Management Area.
- Water quality improvement may be faster since small watersheds generally respond more rapidly.
- A proactive approach can address the most significant water quality concerns.
- Partners can coordinate and align technical and financial resources.
- Partners can coordinate and identify the appropriate source specific conservation practices and demonstrate the effectiveness of these conservation practices.
- A higher density of projects allows neighbors to learn from neighbors.
- A higher density of prioritized projects leads to greater connectivity of projects.
- Limited resources are used more effectively and efficiently.
- Work in one Focus Area, followed by other Focus Areas, will eventually cover the entire Management Area.

SWCDs choose a Focus Area in cooperation with ODA and other partners. In some cases, a Focus Area is selected because of efforts already underway or landowner relationships already established. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach and technical assistance, and to complete (or initiate) projects over a biennium. The current Focus Area for this Management Area is described in Chapter 3.

Working within a Focus Area is not intended to prevent implementation within the remainder of the Management Area. The remainder of the Management Area will continue to be addressed through general outreach and technical assistance.

Strategic Implementation Areas

Strategic Implementation Areas are small watersheds selected by ODA, in cooperation with partners, and after review of water quality and other available information. ODA leads the assessment of current conditions and the landowner outreach. Strategic Implementation Areas and Focus Areas are both tools to concentrate efforts in small geographic areas to achieve water quality standards. As with Focus Areas, SWCDs and partners work with landowners to improve conditions that may impact water quality. However, Strategic Implementation Areas also have a compliance evaluation and assurance process that allows ODA to proactively gain compliance with Ag water quality regulations.

ED_454-000322884 EPA-6822_012405

1.8 Implementation, Monitoring, Evaluation, and Adaptive Management

Implementation of the Area Plan and associated regulations will be assessed by evaluating the status and trends in agricultural land conditions. Measurable objectives will be assessed across the entire Management Area and within the Focus Area. ODA conducts land condition and water quality monitoring at the statewide level and will analyze this and other agencies' and organizations' local monitoring data. The results and findings will be summarized in Chapter 4 for each biennial review. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), objectives, and strategies in Chapter 3, as needed.

1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation

Starting in 2003, ODA began evaluating streamside vegetation conditions using aerial photos acquired specifically for this purpose. ODA focuses on land condition monitoring efforts on streamside areas because these areas have such a broad influence over water quality. Stream segments representing 10 to 15 percent of the agricultural lands in each Management Area were randomly selected for monitoring. ODA examines streamside vegetation at specific points in 90-foot bands along the stream from the aerial photos and assigns each sample stream segment a score based on ground cover. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site capable vegetation varies across the state, there is no one correct riparian index score. The main point is to measure positive or negative change. The results are summarized in Chapter 4 of the Area Plan.

1.8.2 Agricultural Ambient Water Quality Monitoring Assessment

ODA currently evaluates water quality data from monitoring sites in DEQ's water quality database that reflects agricultural influence on water quality. These data are also published in the DEQ water quality database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide. Results from monitoring sites in the Management Area, along with local water quality monitoring data, are described in Chapter 4.

1.8.3 Biennial Reviews and Adaptive Management

The Area Plan and associated regulations undergo biennial reviews by ODA and the LAC. As part of each biennial review, ODA, DEQ, SWCDs, and the LAC discuss and evaluate the progress on implementation of the Area Plan and associated regulations. This evaluation includes enforcement actions, landscape and water quality monitoring, and outreach efforts over the past biennium across the Management Area and for the Focus Area. In addition, progress toward achieving agricultural load allocations may be documented (if a TMDL has been established). As a result of the biennial review, the LAC submits a report to the Board of Agriculture and the director of ODA. This report describes progress and impediments to implementation, and recommendations for modifications to the Area Plan or associated regulations necessary to achieve the purpose of the Area Plan. The results of this evaluation will be used to update the goal(s), measurable objectives, and strategies in Chapter 3.

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Chapter 2: Local Background

2.1 Local Roles and Responsibilities

2.1.1 Local Advisory Committee (LAC)

This Area Plan was developed with the assistance of a LAC. The LAC was formed in 2001 to assist with the development of the Area Plan and regulations and with subsequent biennial reviews. Members are:

LAC Member	Area	Operation
Carol Ach	Leaburg, McKenzie and Coast Fork Willamette	Blueberries, cows, sheep, pigs
Dave Daniel	Pleasant Hill, Coast Fork Willamette	Nursery
Paul Day	Pleasant Hill, Middle Fork Willamette	Livestock, hay, pasture
Donald Hansen	Creswell, Coast Fork Willamette	Grass seed, strawberries, hazelnuts
Steve Houston	Eugene, Coast Fork Willamette	Wine grapes, seed crops, peppermint
Polly Kohl	Springfield, McKenzie	Rural resident, Mohawk Watershed Partnership
Glenn Miller	Eugene, Willamette	Hazelnuts
Art Paz	Springfield, McKenzie	Certified organic blueberries, timber
Alan Petersen, Chair	Springfield, McKenzie	Cattle, hay, timber
Garry Rodakowski	Vida, McKenzie	Hazelnuts
Karl Morgenstern		EWEB
Marc Paulman, Alternate	Dexter, Middle Fork Willamette	Cattle, hay
Jim Sly, Alternate	Creswell, Coast Fork Willamette	Cattle, hay
Jim Goodpasture, Alternate	Vida, McKenzie	Hazelnuts, cattle, hay, timber

2.1.2 Local Management Agency

The implementation of this Area Plan is accomplished through an Intergovernmental Agreement between ODA and the Upper Willamette SWCD. This Intergovernmental Agreement defines the SWCD as the Local Management Agency for implementation of the Area Plan. The SWCD was also involved in development of the Area Plan and associated regulations.

2.2 Area Plan and Regulations: Development and History

The Area Plan and regulations were approved by the director of ODA in June 14, 2002.

ED_454-000322884 EPA-6822_012407

Since approval, the LAC met in 2004, 2008, 2010, and 2012 to review the Area Plan and regulations. The review process included assessment of the progress of Area Plan implementation toward achievement of plan goals and objectives.

A summary of dates and major changes from each biennial review can be included in this section.

2.3 Geographical and Physical Setting

2.3.1 Location, Water Resources, Land Use, Land Ownership, Agriculture

Physical Features

The headwaters for the McKenzie River and Middle Fork are in the Cascade Mountains. The Coast Fork originates in the Calapooya Mountains. The Coast Fork and Middle Fork meet near Goshen to form the Willamette River mainstem. The Willamette River's confluence with the McKenzie River is approximately 15 miles further downstream near Coburg.

The McKenzie River originates from Clear Lake and flows westward through a narrow valley down a steep gradient. It has eight main tributaries: Lost Creek, Horse Creek, McKenzie South Fork, Quartz Creek, Smith River, Blue River, Gate Creek, and Mohawk River. The Mohawk River has the flattest gradient of the tributaries, and there is some relatively level land along it. Level land also extends along the main stem of the McKenzie River.

The Middle Fork River begins at Timpanogas Lake and flows northwest down a steep gradient until it reaches the Willamette Valley floor. Most of its tributaries, including Hills Creek, Salt Creek, Salmon Creek, North Fork, Fall Creek, and Little Fall Creek, flow into the mainstem from the north. Lost Creek flows into the Middle Fork from the south.

The Coast Fork River begins in the Calapooya Mountains, as do several of its tributaries, Brice Creek, Row River, Sharps Creek, Layng Creek, and Mosby Creek. Layng, Sharps, and Brice creeks have relatively steep gradients from headwaters to confluence with the Coast Fork, while Mosby Creek, Row River, and the mainstem Coast Fork have relatively flat gradients. The gradient of the Coast Fork flattens further after it reaches the Willamette Valley floor. Several tributaries, including Camas Swale Creek and Silk Creek, flow into the Coast Fork as it flows north through the valley.

Geology and Soils

Western and High Cascade Mountains

The Cascade Mountains consist of two adjacent mountain ranges, the Western and High cascades. Both ranges are predominantly composed of basaltic lava flows, with lesser amounts of andesite and rhyodacite (Orr et al, 1992). Depending on the hardness of the underlying material, the mainstem and tributaries of the upper Middle Fork and McKenzie rivers have created both steep gorges and gently sloping plateaus. The upper reaches of the McKenzie River have been glaciated, at least as far west as Blue River Reservoir (Boer, personal communication, 2000).

Calapooya Mountains

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The Calapooya Mountains are a mixture of sedimentary and older volcanic rocks. They have been deeply dissected by the Coast Fork and its tributaries. Soils are deep, well-drained silty clay loams and clay loams from sandstone, sediment, and igneous rock (Patching, 1987).

Willamette Valley

Much of the lowlands in the Willamette Valley are alluvium, or material deposited by the rivers and their tributaries. Alluvial materials include sands, gravels, and silts transported from the Calapooya and Cascade mountains. Depending on the composition of the deposited material, soils in bottomlands and terraces range from excessively drained gravelly sandy loam to poorly drained silty clay loam and silty clay (Patching, 1987).

Climate

The McKenzie, Middle Fork, and Coast Fork watersheds experience the same general climate, with wet winters and dry summers. Precipitation generally increases with elevation in the watersheds, ranging from an average of 40 to 50 inches per year on the valley floor to 70 to 80 inches at the summit of the Calapooya Mountains, 80 inches at the headwaters of Little Fall Creek in the Middle Fork watershed, and 110 inches at the headwaters of Blue River in the McKenzie watershed (University of Oregon Department of Geography, 1999). In the upper portions of the watersheds, above 4,000 to 5,000 feet, snow is a significant portion of the precipitation.

Agriculture and Forestry

The predominant land use in the Management Area is forestry. Forestlands comprise approximately 86 percent of the land within the three watersheds (Table 1). Most forestland is in the upper portions of the three watersheds in the Cascade and Calapooya Mountain ranges and extends down the eastern side of the valley floor. The U.S. Forest Service, the Bureau of Land Management, and private industrial landowners are major forestland holders in the watersheds (Table 2).

Agricultural and rural residential land uses in the Management Area are found in the lower valley regions of the three watersheds. These lands account for approximately four percent of the Management Area (Table 3). In the McKenzie watershed, most agricultural lands are in the floodplain, where well-drained sandy loam soils have accumulated by fluvial (rivers and streams) processes. Hazelnuts are a major crop in the watershed, with over 1,200 acres in orchards (Penhallegon, personal communication, 2000). Other commercial crops include blueberries, Christmas trees, peppermint, and row crops. Livestock and pasturelands are the major land use on the Mohawk tributary.

Most of the agricultural land in the Middle Fork watershed is located in the lower portion adjacent to the Willamette River. There is very little land in agricultural use above Dexter Reservoir. The dominant agricultural land use is pasture and hayland. There are some row crops near Jasper, Lowell, and Pleasant Hill. There are also several nurseries, Christmas tree farms and orchards in that area.

The Coast Fork watershed supports agricultural lands from the confluence of the Coast Fork and Middle Fork upstream beyond Cottage Grove. Grass seed, pasture and hayland are the predominant commodities in the watershed. Other agricultural land uses include nurseries, small grains, orchards, vineyards, and field crops.

Table 1. Land uses and land cover in the three watersheds.

Land Use/	Acres	Percent of Land

ED_454-000322884 EPA-6822_012409

Land Cover Category		Use by Category
Agriculture	82,000	4
Forestry	1,858,000	86
Urban/Residential/Other	216,100	10
TOTAL	2,156,100	100

Table 2. Land ownership in the three watersheds.

Landowner/Manager	Acres	Percent of Land
U.S. Forest Service	1,044,600	48
Private Landowners	690,200	32
Forest Service Wilderness Area	255,300	11.8
Bureau of Land Management	142,660	6.6
U.S. Army Corps of Engineers	17,600	0.8
Lane County	2,200	0.1
State of Oregon	2,130	0.1
State Scenic Waterway	1,120	0.1
Joint Corps of Engineers/Lane County	160	0.01
State Parks and Recreation	130	0.01
TOTAL	2,156,100	100

Table 3. Agricultural Lands in the McKenzie, Middle Fork, and Coast Fork.

Watershed	Agricultural Land (acres)	Agricultural Land (percent of all land)
McKenzie	34,000	3.9
Middle Fork	14,000	1.6
Coast Fork	34,000	7.9
TOTAL	82,000	4.0

Cities/Urban

There is one major metropolitan area in the Management Area, as well as smaller cities and rural communities. Most cities are located along the mainstems of the Middle Fork, Coast Fork, and McKenzie rivers. Rural communities co-exist with agricultural areas and are situated on or near the rivers or their tributaries. Both the Willamette and McKenzie flow through the Eugene/Springfield area, and their confluence is just north of Eugene. The 2011 population of the Eugene/Springfield area is over 213,000 with growth percentages higher than the state average over the past ten years. Rural communities include Marcola in the Mohawk watershed; and Blue River, Walterville, Leaburg, Vida, Nimrod, Finn Rock, and McKenzie Bridge along the McKenzie River. Most of these communities have populations below 500. Two incorporated cities exist along the Coast Fork watershed: Cottage Grove, with 9,686 residents, and Creswell, with 5,031 residents. Rural communities in the Coast Fork watershed include Disston, Culp Creek, Dorena, London, Latham, Saginaw, Walker, Delight Valley, Cloverdale, and Goshen. Along Highway 58, the cities of Oakridge (pop. 3,205), Lowell (pop. 1,045) and Westfir (pop. 278) are located centrally in the Middle Fork watershed (Population Research Center, 2011). Rural communities in the Middle Fork watershed include Dexter, Fall Creek and Jasper.

Roads

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There is an extensive network of public and private roads within the three watersheds. Heavily traveled public roads include Interstate 5, which runs north-south through Eugene-Springfield, Creswell, and Cottage Grove; Highway 126, the main route through the McKenzie watershed over the Cascade Mountains; and Highway 58, which begins near Goshen and travels southeast over the Cascades.

Recreation

Recreation within the Management Area relates closely to the scenic landscape. Activities such as camping, hiking, fishing, hunting, skiing, and boating draw thousands of visitors to the three watersheds every year. Several reservoirs provide recreational opportunities in the summer months, including Dorena Reservoir on the Row River, Dexter Lake on the Middle Fork, and Cougar Reservoir on the McKenzie. Table 5 provides a complete list of recreational reservoirs in the Management Area.

Watershed Functions

Other functions of land in the watersheds include retention and slow release of rainwater, flood control, groundwater recharge, and filtration of pollutants. All watersheds provide these functions to some degree depending on local conditions and the amount and types of developments.

Water Resources

Water Availability

Both rainwater and snowmelt contribute to water supplies in the three watersheds. More surface water is supplied by snowmelt in the McKenzie and Middle Fork watersheds than in the Coast Fork because their headwaters are in the High Cascades. Flows in the McKenzie and Middle Fork are less variable than in the Coast Fork. Coast Fork seasonal flow patterns are more similar to streams originating in the Coast Range, with flows in the winter greatly exceeding summer flows even with human-caused changes to the flow regime. Summary flow data for the McKenzie, Middle Fork, and Coast Fork are listed in Table 4.

Table 4. Average annual, summer, and winter flows in cubic feet per second (cfs) for the McKenzie, Middle Fork and Coast Fork (U.S. Geological Survey, 2000).

Watershed	Average Annual Flow (cfs)	Average Summer Flow (cfs)	Average Winter Flow (cfs)
Coast Fork at Goshen	1611	416	3342
McKenzie at Coburg	5897	3183	9582
Middle Fork at Jasper	4154	2318	6433

Groundwater is most plentiful in the three watersheds in areas with alluvial deposits and porous lava flows. The High Cascades store a great deal of water from snowmelt, and the release of this water during the summer helps keep flows relatively constant in the McKenzie and Middle Fork watersheds. Alluvial deposits from the mouth of the Middle Fork to Dexter Dam, at the mouth of the McKenzie, along the McKenzie to Belknap Springs, and along the Coast Fork on the Willamette Valley floor, store large quantities of groundwater.

Dams and Reservoirs

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Thirteen dams and reservoirs in the three watersheds are used for flood control in the winter and flow augmentation in the summer. They also provide recreation, irrigation, and power generation. Table 5 summarizes the uses of each dam and reservoir, storage capacities, and priority for augmentation of summer flows in the Willamette River.

The reservoirs influence seasonal water availability and flow patterns in the three watersheds. Summer water releases boost flows in the McKenzie to one-third higher than normal (Lane Council of Governments, 1996). The Coast Fork, once an ephemeral river, now flows year-round because of summer water releases from Dorena and Cottage Grove reservoirs.

Table 5. Uses, Capacities, and Drawdown Priority for Reservoirs in the Management Area (U.S. Army Corps of Engineers, 2000; Oregon Water Resources Department, 2000).

Watershed	Project	Uses of Water	Summer Reservoir Storage Capacity (Acre-feet)	Summer Drawdown Priority
Coast Fork	Cottage Grove	Recreation, flood control	28,700	5
Coast Fork	Dorena	Recreation, flood control	65,000	5
McKenzie	Blue River	Recreation, summer flow augmentation, flood control	78,800	3
McKenzie	Carmen	Hydropower	261	N/A
McKenzie	Cougar	Hydropower, recreation, summer flow augmentation, flood control	143,900	2
McKenzie	Leaburg	Hydropower, recreation	345	N/A
McKenzie	Smith	Hydropower	15,000	N/A
McKenzie	Trail Bridge	Hydropower	2,263	N/A
McKenzie	Walterville	Hydropower	100 (Intake) 345 (S. Pond)	N/A
Middle Fork	Dexter	Re-regulate flow from Lookout Point Reservoir, recreation	N/A	N/A
Middle Fork	Fall Creek	Recreation	108,200	5
Middle Fork	Hills Creek	Recreation	194,600	4
Middle Fork	Lookout Point	Flood control, hydropower	324,200	1

Water Use

Consumptive uses of water in the three watersheds include irrigation, municipal use, and commercial use. Irrigation is the primary consumptive use for which water rights are issued. Municipal water rights supply drinking water to several hundred thousand people in Lane County. Non-consumptive uses include recreation, power generation, and fish and wildlife habitat. Sources of appropriated water are reservoirs, surface water, and groundwater. Table 6 summarizes water allocations in the three watersheds. Actual water use is typically lower than water appropriated.

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Table 6. Appropriations of surface water, groundwater, and reservoir water in the three watersheds (Oregon Water Resources Department, 2000). Appropriations are in cubic feet per second (cfs) and acre-feet (af).

	McKenzie		Middle Fork		Coast Fork	
Water Use	cfs	af	cfs	af	cfs	af
Irrigation	274	49,000	52	10,173	110	21,507
Fish and Wildlife	292	45	93	47	6	35
Agriculture	1	3	1	11	4	11
Industrial	10,078	18,493	30	620	45	793
Municipal	338	0	50	0	40	1
TOTALS	10,983	67,541	226	10,851	205	22,347

In the McKenzie, over 9,975 cubic feet per second of industrial water rights are appropriated for hydropower, a non-consumptive use.

2.3.2 Geographic and Programmatic Scope

The Management Area includes the McKenzie, Middle Fork of the Willamette (Middle Fork), and Coast Fork of the Willamette (Coast Fork) watersheds. The watersheds are located primarily in the eastern portion of Lane County in western Oregon. Small portions of the McKenzie and Coast Fork watersheds are also located in Linn and Douglas counties. Communities in the Management Area include the cities of Springfield, Lowell, Oakridge, Westfir, Creswell, and Cottage Grove, as well as several unincorporated communities mentioned in Section 2.1.5.

Boundaries of the Management Area are the Cascade Mountains to the east, Calapooya Mountains to the south and west, Long Tom watershed to the west, and the Coburg Hills to the north. The three watersheds cover approximately 3,361 square miles, or 2,156,080 acres. Elevations range from about 350 feet above sea level near the mouth of the McKenzie to 10,354 feet on the North Sister in the Cascades (Oregon Water Resources Board, 1961). The McKenzie's confluence with the Willamette near Coburg is the furthest point downstream in the Management Area.

2.3.3 Map of the Management Area

Figure 3: Southern Willamette Valley Agricultural Water Quality Management Area.

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2.4 Agricultural Water Quality in the Management Area

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2.4.1 Local Issues of Concern

Within the Management Area, several segments of the three main rivers and their tributaries have been identified by the DEQ as "water quality limited" and are on the 303(d) list of water quality limited waterbodies. As shown in Appendix C, sixty-two stream segments in the three watersheds are listed for temperature (although these are listed, they are covered by the TMDL), five segments are listed for low dissolved oxygen levels, and five segments in the Coast Fork and two segments in the McKenzie subbasin are listed for toxics (mercury).

2.4.2 303(d) List of Impaired Water Bodies

In response to the 303(d) listings through 2006, DEQ developed TMDLs for the entire Willamette Basin for temperature, bacteria (*E. coli)*, and mercury (Oregon Department of Environmental Quality, 2006). The Willamette TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/willamette.htm). The Willamette Basin also has a TMDL for dioxin (Oregon Department of Environmental Quality, 1991). The dioxin TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/columbia.htm#dd). Other impairments identified in the Management Area, such as flow and habitat modification, do not require TMDLs. Table 4 summarizes the agricultural load allocations that apply to the Management Area.

The Willamette mainstem is also listed for several toxins, iron, and dioxin, but these are beyond the scope of this Area Plan. If a Willamette Basin TMDL is developed in the future for any of the toxins, it may include agricultural load allocations that apply to the entire Management Area.

While this Area Plan applies to all agricultural water pollution, it focuses specifically on parameters on the 303(d) list and TMDLs in the Management Area including temperature, bacteria (*E. coli)*, and mercury. Appendix C lists the impaired waterbodies from the 2010 303(d) list. More information is available in the 2010 integrated report and 303(d) list database on the DEQ website (www.deq.state.or.us/wq/assessment/2010Report.htm).

2.4.3 Basin TMDLs and Agricultural Load Allocations

Temperature
DEQ endeavored to set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Management Area. Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Many sources contribute to elevated stream temperatures. On agricultural lands, absence of streamside vegetation, water withdrawals, and land management that leads to widened stream channels contribute to elevated stream temperatures. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities.

Bacteria
DEQ has set the bacteria *Escherichia coli (E. coli)* TMDL to protect human water contact recreation (risk of infection and disease to people who come in contact with fresh water while fishing, swimming, or boating), the most sensitive beneficial use. On agricultural lands, *E. coli* generally comes from livestock waste, either deposited directly into waterways or carried to waterways via runoff and soil erosion. Runoff and soil erosion from agricultural lands may also carry bacteria from other sources. There are numerous sources of bacteria in streams, including humans (from recreation, failing septic systems, or discharges from wastewater treatment plants) and wildlife.

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Mercury
Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. On agricultural lands, if mercury is contributed it is through eroded soils.

Other Parameters of Concern:

Sediment
A TMDL has not been set for sediment, but it can be of concern related to agricultural lands. Sediment carried in streams can adversely affect aquatic life by increasing water temperature through thermal absorption, reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. Sediment deposition can also change the width:depth ratio of a stream, which directly influences stream temperature. Potential sources of sediment include streambank erosion, home building or construction sites, and runoff from agricultural lands.

Nutrients
A TMDL has not been set for nutrients, but it can be of concern related to agricultural lands. Fertilizers and manure are the main agricultural sources of nutrients. Improper storage or application can result in discharge of nutrients into either surface or ground water. Fertilizer run-off has been identified as one of the major contributing factors to algae blooms, including harmful algae blooms containing toxin-producing cyanobacteria species. In the recent past, Oregon Health Authority has issued algae bloom advisories for Dorena Reservoir, Dexter Reservoir, and Hill Creek Reservoir. Nutrients can also come from waste discharge, runoff, or seepage from urban areas, industrial and wastewater treatment plants, and septic systems, sediment runoff from forestlands, and background sources.

Aquatic Weeds and Algae
Harmful algal blooms are caused by over-production of naturally occurring cyanobacteria (blue-green algae). Some species release toxins that are harmful to humans, livestock, pets, and wildlife. When levels of nutrients, temperature, pH, and light are optimal, cyanobacteria grow rapidly, resulting in blooms where cyanobacteria are the dominant form of life in their environment. Cyanobacteria can cause negative impacts to water quality, including: taste and odor problems in drinking water, unpalatable fish, elevated pH levels, and low dissolved oxygen levels. Nutrients entering the watershed from agricultural activities can accumulate in reservoirs or lakes and may fuel algal blooms and move downstream. Low stream flows and high water temperatures downstream could also make conditions favorable for an algal bloom.

In addition to the Willamette Basin TMDLs, TMDLs for phosphorus and ammonia were developed for the Coast Fork watershed in 1996 to address low dissolved oxygen and high pH levels.

Table 4: Agricultural Load Allocations that Apply to the Management Area

Geographic Scope in Management Area	TMDL	Load Allocation for Agriculture
Parameter: Temperature		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human use allocation (with a surrogate of effective

ED_454-000322884 EPA-6822_012416

		shade)
McKenzie Subbasin	Willamette TMDL (2006), Chapter 11	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human human use allocation (with a surrogate of effective shade)
Middle Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 12	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human human use allocation (with a surrogate of effective shade)
Coast Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 13	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human human use allocation (with a surrogate of effective shade)
Parameter: Bacteria		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	66 to 83% reduction from agricultural areas compared to average loads in 2006
Parameter: Mercury		
Entire Management Area	Willamette TMDL (2006), Chapter 3	Agriculture: 27 percent reduction compared to average loads in 2006
Parameter: Dioxin		
Entire Management Area	Columbia River Basin TMDL (1991)	Only pulp and paper mills have been assigned an allocation; agriculture is a potential source, but no load allocation has been assigned due to lack of data

2.4.4 Beneficial Uses and Parameters of Concern

Beneficial uses of water in the three watersheds include water contact recreation; habitat for aquatic organisms and wildlife; agricultural, domestic, municipal, and industrial water supplies; and aesthetics (Appendix D). A waterbody is placed on the 303(d) list for a particular parameter when water quality is deemed no longer adequate to protect the most sensitive beneficial use. Beneficial uses impacted by temperature in the three watersheds include bull trout habitat and salmon spawning and rearing habitat. Mercury in the Coast Fork Willamette has appeared in fish tissues in elevated levels, endangering aquatic life and preventing human consumption of fish. Water contact recreation is impacted in the Coast Fork because of high bacteria levels. High concentrations of phosphorus promote growth of algae, impact pH levels, and lower dissolved oxygen levels.

ED_454-000322884 EPA-6822_012417

2.4.5 Sources of Impairment

Within the Management Area, several segments of the three main rivers and their tributaries have been identified by the DEQ as "water quality limited" and are on the 303(d) list of water quality limited waterbodies. As shown in Appendix C, sixty-two stream segments in the three watersheds are listed for temperature (although these are listed, they are covered by the TMDL), five segments are listed for low-dissolved oxygen levels, and five segments in the Coast Fork and two segments in the McKenzie subbasin are listed for toxics (mercury).

2.5 Prevention and Control Measures

Each section is intended to include an overview of the issue, the regulations, and beneficial or available management practices. At a minimum, sections on riparian areas, waste, and sediment should be included. (Note: If prevention and control measures are called something else in this Area Plan and Area Rules, i.e., prohibited conditions or regulations, this will need to be clarified for this Area Plan). Area Plans incorporate the Area Rule language in the appropriate Prevention and Control Measures section in a highlighted box to be kept separate from the plan. Either within the first paragraph or an introduction to this section, language should be included that the goals are achieved through Prevention and Control Measures, which includes both voluntary practices and requirements.

This section provides the primary discussion of the measures that individual landowners or operators should consider implementing on their property for the prevention and/or control of sources of water pollution associated with agricultural activities. It contains discussion of a landowner's responsibilities concerning the particular issue. Prevention and control measures vary with local management area issues and may include irrigation management, upland management, erosion control, livestock management, and other areas of local concern. Sample text can be found in the Mid Coast Area Plan related to Waste, Riparian Areas, and Fine Sediment. Text for each section is not required, but available.

The focus of the Agricultural Water Quality Program is on voluntary and cooperative efforts by landowners, the ODA, and others to protect water quality. However, the Agricultural Water Quality Management Act also provides for a regulatory backstop to ensure prevention and control of water pollution from agricultural sources in cases where landowners or operators refuse to correct problem conditions. Agricultural Water Quality Management Area Rules serve as this backstop while allowing landowners flexibility in how they protect water quality. Area Rules are goal-oriented and describe characteristics that should be achieved on agricultural lands, rather than practices that must be implemented.

This LAC developed Area Rules (Characteristics to Achieve) to protect water quality and prevent and control water pollution from agriculture. The LAC also considered the time and expense that would be involved for area landowners to meet the rules. As a result, each rule has an implementation date the LAC believed would be acceptable to area landowners.

This Area Plan serves as a guidance document, and as stated in the Foreword, does not establish provisions for enforcement. The Area Rules developed with input from the LAC, OARs 603-095-2100 to 603-095-2160, are included in this document only as a reference for landowners. Each Area Rule has a border around it and appears in italics.

The Characteristics to Achieve and Area Rules relate directly to water quality concerns identified on the 303(d) list in the Management Area, and for the bacteria, mercury and temperature TMDLs that were established in September 2006. Rules specific to mercury are not developed, but Area Rules in the

ED_454-000322884 EPA-6822_012418

Characteristics to Achieve for waste, riparian areas, and erosion/nutrients are also effective for control of mercury. The concerns addressed in the Area Rules are:

- Temperature
- Phosphorus
- Bacteria
- Toxics
- Mercury

2.5.1 Nutrients and Manure Management

Characteristic to Achieve for Waste

Issue: Oregon Revised Statute 468B.025 is an existing statute that addresses water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Rules in the state. For more information and text of ORS 468B.025 and 468B.050, please consult Appendix H.

Characteristic to Achieve

OAR 603-095-2140
(1)(a) Waste. Effective upon rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

Parameters Addressed by this Characteristic to Achieve:

Bacteria, toxics, and mercury

2.5.2 Riparian/Streamside Area Management

Note: This language should be used if the Area Plan does not currently have adequate language to address the role of streamside vegetation. This information is more important to the landowner, and Chapter 2 is intended as the landowner guide.

Characteristic to Achieve for Riparian Areas Issue: The intent of this measure is to maintain and protect riparian vegetation, minimize erosion of streambanks due to agricultural activities, allow water percolation into the soil, and encourage shading of streams, thus providing proper function of the riparian area.

Landowners are not responsible for streambank erosion resulting from natural channel migration and meander formation (OAR 603-095-2140(1)).

Please consult Appendix J for more background information on this Characteristic to Achieve.

ED_454-000322884 EPA-6822_012419

Characteristic to Achieve

OAR 603-095-2140
(1)(b) Riparian areas. By January 1, 2004, agricultural management shall allow establishment and maintenance of vegetation along perennial streams consistent with the capability of the site to provide riparian functions necessary to help moderate solar heating and for streambanks to withstand flows resulting from a 25-year, 24-hour storm event.

Parameters Addressed by this Characteristic to Achieve:

Temperature.

Role of Streamside Vegetation to Prevent and Control Pollution
Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement where needed to prevent and control agricultural water pollution. There are several reasons for this emphasis:

- Streamside vegetation improves water quality for multiple parameters, including: temperature, sediment, bacteria, nutrients, toxics, and pesticides.
- The presence of healthy streamside vegetation indicates that agriculture is addressing water quality concerns.
- Landowners have the authority and ability to take steps to improve streamside vegetation.
- Streamside vegetation provides additional functions, including fish and wildlife habitat.
- Streamside vegetation keeps water cool and banks stable.

Adequate streamside vegetation provides three primary water quality functions (Council for Agricultural Science and Technology, 2012; National Council for Air and Stream Improvement, 2000; State of Oregon, 2000). Local agricultural water quality regulations require that agricultural activities provide these functions *(text needs to be adjusted to state the functions required under the Management Area's specific rule)*:

- Stream temperature moderation (vegetation blocks direct solar radiation).
- Reduced streambank erosion (roots stabilize banks and dissipate stream energy).
- Filtration of pollutants (e.g., bacteria, nutrients, toxics, sediment) from overland flows.

Adequate streamside vegetation also provides additional water quality functions (see references listed in paragraph above):

- Water storage that provides cooler and longer duration late season flows.
- Sediment trapping that builds streambanks and floodplains.
- Infiltration of water into the soil profile.
- Narrowing and deepening of channels.
- Biological uptake of sediment, organic material, nutrients, and pesticides.
- Maintenance of streamside integrity during high flow storm events.

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streamsides need to provide the functions that prevent and control water pollution. Site-capable vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, wildlife, fire, floods) and historical and current human influences (e.g., channelization, roads, invasive species, past land management). Site-capable vegetation can be determined for a specific site based on: current streamside vegetation at the site, streamside vegetation at

ED_454-000322884 EPA-6822_012420

nearby reference sites (with similar natural characteristics), NRCS soil surveys, and other scientific references.

In some cases, mature site-capable vegetation may not be needed to provide the three primary water quality functions. For example, mature trees may not be necessary to protect water quality; willows or other shrubs may suffice to provide adequate shade and protect streambanks on small streams.

In other cases, mature site-capable vegetation may not provide these three functions:

- Mature junipers are site-capable vegetation in central and eastern Oregon, but they reduce bank stability and increase erosion.
- Invasive grasses can be the dominant site-capable vegetation along streams, but they generally do not provide all of the required water quality functions.
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down cutting, but they do not improve water quality.

2.5.3 Soil Erosion Prevention and Control

Characteristics to Achieve for Erosion/Nutrients

Issue: The intent of these measures is to prevent water from carrying sediment and nutrients into waters of the state.

Characteristics to Achieve

OAR 603-095-2140
(1)(c) Erosion and Nutrients:
(A) By January 1, 2004, soil erosion from agricultural activities shall not exceed the tolerable soil loss T.
(B) By January 1, 2004, landowners or operators shall prevent pollution from irrigation surface water return flow to waters of the state.

Parameters Addressed by this Measure:

Phosphorus, toxics, and mercury

For more information on erosion and the tolerable soil loss T, please consult Appendix G.

2.5.4 Pesticides

Issue: The intent of this condition is to prevent introduction of pesticides, which include herbicides and fungicides, into waters of the state. Pesticide users should always read the label prior to storing, mixing, or applying pesticides. ORS 634.372 (2) and (4) require users to follow label recommendations for all pesticides. Please consult Appendix H for the text of ORS 634.372.4.5.

2.5.5 Mercury

Issue: Mercury is a metal, liquid at room temperature, commonly used in the recent past for thermometers. It continues to have many dental, medical, and industrial uses. It is found naturally in the soils of the Willamette Valley. It is also found in fossil fuels and is released into the air upon combustion. In the air, mercury can travel over continents and oceans to be deposited on land, added to naturally occurring mercury, and carried by storm water and erosion into Oregon's waterways. Fish consumption

ED_454-000322884 EPA-6822_012421

is the most common way humans are exposed to elevated levels of mercury (Oregon Department of Environmental Quality, 2007).

Mercury is also a severe poison. According to the DEQ (2007), small children and fetuses are most sensitive to mercury's toxic effects.

Mercury from point and non-point sources is bio-accumulating in fish tissue to levels that adversely affect public health. Mercury binds to particles; and there are both higher levels of total suspended solids as well as higher mercury levels in the wet season. In setting the TMDL for mercury, DEQ has found that erosion of native soil makes up almost 48 percent of the mercury in the Willamette Basin. Some industrial facilities and domestic wastewater treatment facilities also discharge mercury, but at low levels.

The current DEQ mercury TMDL consists of interim targets and allocations. Sometime in 2011 DEQ plans to finalize these after additional data collection and public outreach (Oregon Department of Environmental Quality, 2007).

Existing Area Rules help control mercury from agricultural sources by limiting erosion, filtering sediment, and controlling pollution. No specific rule to control mercury from agricultural activities is necessary at this time. Refer to the characteristics to achieve for waste, riparian area, and erosion/nutrients for the Area Rules that address mercury in this area.

2.5.6 Optional Issues: Upland Management, Irrigation Management, Livestock Management

Role of Upland Vegetation to Prevent and Control Pollution
Upland areas are the rangelands, forests, and croplands located upslope from streamside areas. Upland areas extend to the ridge-tops of watersheds. With a protective cover of crops and crop residue, grass (herbs), shrubs, or trees, these areas will capture, store, and safely release precipitation, thereby reducing the potential of excessive soil erosion or delivery of soil or pollutants to the receiving stream or other body of water.

Healthy upland areas provide several important ecological functions, including:

- Capture, storage, and moderate release of precipitation reflective of natural conditions.
- Plant health and diversity that support cover and forage for wildlife and livestock.
- Filtration of sediment.
- Filtration of polluted runoff.
- Plant growth that increases root mass, utilizes nutrients, and stabilizes soil to prevent erosion.

2.5.7 Menu of Optional Management Practices

Landowners are neither required to cease a specific practice nor implement a particular practice by the Area Plan or Rules. The following tables are intended as suggestions for landowners who want ideas on how to meet Area Rules and generally maintain and enhance natural resources on their property. The tables provide some idea of the water quality benefits of each practice as well as potential costs and benefits to landowners. The tables are organized by resource, such as nutrients and manure.

Landowners who want more information on any of the following practices, or who are looking for other ideas for water quality improvement and conservation on their lands, may contact several agencies and organizations that provide technical assistance, including the Upper Willamette SWCD, the NRCS, and the Oregon State University (OSU) Extension Service. Also, please consult Appendix I for a list of publications describing water quality improvement practices for agricultural landowners.

ED_454-000322884 EPA-6822_012422

Riparian Areas and Streams

Practice	Resource Concerns Addressed	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
a. Rotational grazing in riparian area; timed when growth is palatable to animals and when riparian areas are not saturated.	May help establish desirable riparian vegetation.	Allows limited use of riparian area for grazing, improves wildlife habitat.	Requires intense management to insure that grazing does not prevent site capable vegetation from establishing.
b. Livestock exclusion from riparian area; establishing off-stream watering facilities.	Helps promote desirable riparian vegetation; promotes streambank integrity; helps filter nutrients and sediment from runoff; may help narrow channel and reduce erosion in channel; reduces effects of solar radiation.	May lessen streambank erosion and loss of pastures; less time involved in managing livestock grazing in riparian area, improves wildlife habitat.	May require higher weed control costs in riparian areas than seasonal riparian grazing. May require financial investment for livestock control and off-stream watering facilities.
c. Planting perennial vegetation in riparian area.	Helps establish perennial riparian vegetation rapidly; promotes streambank integrity; may help narrow channel and reduce erosion in channel; reduces effects of solar radiation.	May lessen streambank erosion and loss of pastures. If livestock are excluded from riparian area, area may be eligible for federal cost-share programs. Some alternative perennial agricultural products may be harvested from riparian areas.	Costs of vegetation and weed control. May require financial investment for riparian fencing and off-stream watering facilities while vegetation establishes.

Nutrient and Manure Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply nutrients according to soil test results and at agronomic requirements.	Helps prevent nutrient and bacteria runoff into surface water or leaching into groundwater.	May help reduce fertilizer costs; ensures that plants receive needed nutrients for growth; makes plants more competitive against weeds.	Costs of soil testing; time associated with taking soil samples.
b. Store manure	Helps prevent nutrient and	Prevents nutrient	Cost of constructing

ED_454-000322884 EPA-6822_012423

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
under a tarp or roof; preferably on an impervious surface such as concrete or plastic.	bacteria runoff into surface water or leaching into groundwater.	leaching so manure applied on crops or pasture has higher nutrient content; may save some fertilizer costs; producers wishing to construct storage facilities may apply for funding programs.	manure storage facilities.
c. Establish animal heavy use areas, where animals can be confined during the winter to protect other pastures from trampling and compaction. When soils are saturated, limit livestock access to pastures; cover animal heavy use areas with rock, hog fuel, and/or geotextile.	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside areas.	Protects pastures from compaction during the winter, improving growth. May improve animal health by covering animal heavy use areas with material so animals are not wading in mud.	Cost of fencing animal heavy use area; cost of feeding hay during the winter; cost of materials for protecting animal heavy use area; may mean landowner will need a Confined Animal Feeding Operation Permit.
d. Site barns and animal heavy use areas away from streams.	Helps prevent sediment, nutrient, and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside areas.	Helps prevent flooding in barns and animal heavy use areas.	Need either off-stream watering facility or other source of water for livestock.
e. Prevent silage leaching and/or store and manage leachate from silage and other vegetative materials.	Helps prevent nutrient runoff into surface water or leaching into groundwater.	Preventing leaching maintains higher nutrient content of ensiled feed material.	May require cost of facility development and purchase of moisture-absorbing materials.
f. Installing gutters and downspouts in areas with high livestock use.	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater.	May improve animal health by lessening mud during the winter, so animals are not wading in mud.	Cost of installation and maintenance of gutters and downspouts.

ED_454-000322884 EPA-6822_012424

Erosion, Sediment, and Mercury Control

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Grazing management: graze pasture plants to appropriate heights, rotate animals between several pastures; provide access to water in each pasture.	Helps prevent sediment, nutrient, mercury, and bacteria runoff into waters of the state. Helps protect streamside areas.	May improve pasture production; easy access to water may increase livestock production as well. May improve composition of pasture plants and help prevent weed problems.	Cost of installing fencing, watering facilities for rotational grazing system; time involved in moving animals through pastures.
b. Farm road construction: construct fords appropriately, install water bars to divert runoff to roadside ditches.	Helps prevent sediment and mercury runoff to waters of the state.	May help prevent water damage on farm roads.	Cost of installation and maintenance.
c. Plant appropriate vegetation along drainage ditches; seed ditches following construction.	Helps prevent sediment and mercury runoff into waters of the state.	May help prevent ditch bank erosion and slumping.	Costs of establishing vegetation.
d. Plant cover crops in orchards or nurseries.	Helps prevent sediment and mercury runoff into waters of the state; helps filter nutrients and slow runoff.	May reduce weed problems in orchards and nurseries; prevents loss of applied fertilizer.	Costs of establishing cover crops; cover crops may compete with primary crop.
e. Irrigate pasture or crops according to soil moisture and plant water needs.	Helps prevent irrigation return flow and associated nutrients, sediment, and mercury to waters of the state.	May reduce costs of irrigation; may help crop or pasture production.	Installation/ maintenance cost. Monitoring time.
f. Install/maintain diversions to prevent unwanted drainage into barnyards and animal heavy use areas.	Helps prevent nutrient and mercury runoff into waters of the state.	Decreases muddiness and shortens saturation period in protected areas.	Cost of installation.

Pest Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply pesticides according to the label. Use the correct rate and	Reduces risk of pesticide runoff to streams or other water resources.	Compliance with Oregon law; reduces health risks to applicator, may	

ED_454-000322884 EPA-6822_012425

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
timing. Comply with label restrictions and precautions.		decrease costs.	
b. Triple rinse pesticide application equipment; dispose of rinse water and containers according to Oregon law. Apply rinsates to sites. Dispose of or recycle clean containers according to Oregon law.	Reduces risk of pesticide runoff to streams.	Compliance with Oregon law. Eliminates disposal costs of collected rinsates identified as hazardous waste.	
c. Calibrate, maintain, and correctly operate application equipment.	Reduces risk of pesticide runoff to streams.	May reduce use and therefore cost of pesticides; reduces health risks to applicator.	Time involved to scout fields is usually offset by reduced or more effective pesticide use.
d. Integrated pest management practices such as pheromone traps, beneficial insect release, and field monitoring. (either in combination with pesticide use or as a replacement to pesticide use)	Reduces risk of pesticide runoff to streams, may reduce loss of non-target species.	May improve effectiveness of pest control system.	
e. Store and mix pesticides on leak-proof facilities.	Reduces risk of pesticide runoff to streams or soil contamination.	Helps protect drinking water; reduces health risks to applicator.	Cost of installation and maintenance.
f. Properly dispose of older unwanted legacy chemicals.	Prevents accidental release of unwanted pesticides into the soils or waterways.	Unwanted chemicals and risk are removed from the producers property.	None if taken to a hazardous waste collection event. These are held periodically in Lane Cty.

Nutrient and Irrigation Efficiencies

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
Apply fertilizer at the correct rate and time applications for crop uptake.	Reduces the risk of excess nitrogen in the soil at the end of the growth season.	Precise application saves the producer money in fertilizer costs.	Time related to precision application.
Sample soil prior to	Prevents the application of	Precise application	Cost of soil sampling and

ED_454-000322884 EPA-6822_012426

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
fertilizer application to know existing nutrients.	excess nutrients.	saves the producer money in fertilizer costs.	analysis.
Plant winter cover crops to take up excess nitrogen left over after crops are harvested.	Takes up extra nitrogen and limits potential for leaching into ground water.	Stores extra nitrogen in plant matter for later release when cover crop is incorporated into the soil.	Cost of seed and fuel to plant cover crop.
Properly maintain irrigation systems to prevent over-irrigation.	Prevents leaching of excess nitrogen past the root zone.	Uniform irrigation application and save producer money on nitrogen costs.	Replacement nozzles at least every four years is recommended.
Monitor soil water content and adjust irrigation schedules to maintain soil water content in an appropriate range in the root zone.	Prevents over- irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Soil monitoring equipment and time to evaluate soil water content.
Schedule irrigation applications based on expected evapotranspiration rates.	Prevents over- irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Time to evaluate expected evapotranspiration rates.

Selker et al, 2004

ED_454-000322884 EPA-6822_012427

ED_454-000322884 EPA-6822_012428

Chapter 3: Goals, Objectives, and Strategies

Mission

The mission of this Area Plan is to develop a framework of strategies for agricultural lands within the McKenzie, Middle Fork, and Coast Fork watersheds (the Management Area) that will contribute to desirable water quality and to develop programs to achieve the goals of the plan while maintaining the economic sustainability of agriculture.

3.1 Goal

Specific goals include:

- Prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Ensure that agricultural activities do not contribute to water pollution or diminished water quality as defined within 303(d) listings and TMDLs.
- Monitor and evaluate the effectiveness of the Area Plan.
- Reduce agriculture's contribution to water quality parameters of concern through education and outreach, and by promoting Optional Management Practices.
- Achieve the following land conditions on agricultural lands throughout the management area that contribute to good water quality.
    - Streamside vegetation provides streambank stability, filtration of overland flow, and moderation of solar heating, consistent with site capability.
    - No visible sediment loss from cropland through precipitation or irrigation induced erosion.
    - No significant bare areas within 50 feet of streams on pasturelands and/or rangelands.
    - Active gullies have healed or do not exist on pasturelands.
    - Livestock manure is stored under cover during the winter and in a location that minimizes risk to surface and groundwater.

3.2 Measurable Objectives

To achieve the Area Plan goal, the following measurable objectives, strategies, milestones, and timelines were developed:

Objectives deemed necessary by the LAC to achieve these goals include:

- Manage sheet and rill erosion to a rate that does not exceed an acceptable level.
- Curb the amount of active streambank erosion.
- Prevent any conditions already prohibited under ORS 468B.025 and 468B.050.
- Manage irrigation surface water return flow to prevent waters of the state from exceeding state water quality standards.
- Improve/maintain the ability of riparian areas to respond and function according to vegetative site capability.
- Provide suggestions of optional measures that could help achieve water quality goals.
- By the 2014 biennial review, a rough assessment of streamside vegetation conditions along agricultural lands in the entire management area will be complete. This assessment can be used to track and report progress in streamside vegetation improvements over time and to identify areas to focus work. Assessment results will be considered at the 2014 biennial review and may be used to revise the goals below.

ED_454-000322884 EPA-6822_012429

- By the 2016 biennial review, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural areas as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as allowing riparian establishment but not at site capability will have reached site capability.
- By the 2014 biennial review, ODA and the LMA will compile information about the location, number, and size of water quality improvement projects completed in the priority area since area plan and rules adoption, as resources and grant program privacy rules allow.
- A small geographic area has been identified within the Management Area, where voluntary outreach and technical assistance work has been focused since 2011 and an initial assessment of streamside conditions was completed. ODA and the LMA will report back to the LAC on the status of land conditions, and outreach and technical assistance efforts in the area, at the 2014 biennial review.
- By the 2014 biennial review (or other appropriate date), the Local Management Agency will have offered technical assistance to all landowners in the area with lands where agricultural activities appear to prevent streamside vegetation from establishing. By the 2014 biennial review, the LMA will report back to the LAC and ODA on the amount of lands where landowners accept voluntary assistance to allow streamside vegetation to establish and develop.
- By the 2014 biennial review (or other appropriate date), ODA and/or the LMA will complete a follow-up assessment in the area and evaluate land condition changes over the two-year period.

Please consult Section 3.3 for more detailed strategies identified by the LAC to achieve the mission, goals, and objectives.

3.2.1 Milestones (Targets) and Timelines

The following milestones and timelines were developed in cooperation with ODA, DEQ, the LAC, and the SWCDs. Focus Area Action Plans are developed as a tool with milestones and timelines for implementation of the Area Plan within a defined geographic area.

A description of how the Management Area will be assessed and the timeframe for assessment must be included. If the LAC is not immediately receptive, talk with Mike and John about how to work with the LAC over the next biennium. This section is a continuing project.

3.2.2 Focus Area

Priority Areas: Strategic Implementation of the Area Plan

Beginning in April 2010, ODA, the LMA, the LAC, and other partners began work to identify Priority Areas within the Management Area. At the 2010 biennial review, the LAC expressed the importance of areas for focused work being identified through a strategic approach. Partners evaluated 6th field watersheds within the Management Area based on existing water quality issues, agriculture's effect on water quality, existing work and partner relationships within the watershed, and identification of the watershed as an existing priority by partners. Through this process, ten 6th field watersheds were

ED_454-000322884 EPA-6822_012430

identified for additional evaluation. The number of tax lots, land use, agricultural activities, and identified water quality issues were considered.

Outreach and technical assistance will be focused in these areas, and every landowner with potential land condition concerns will be contacted with an offer of voluntary assistance. ODA, the LMA, and the LAC will measure, evaluate, and document the effectiveness of the Area Plan by assessing changes in land conditions in the current area of focus during the biennial review of the Area Plan. During each biennial review, the partners will also assess the timeline and sequence for working in the initial priority area and in future priority areas.

Gettings Creek Watershed: First Area of Focus

Gettings Creek is a small perennial stream that is a tributary to the Coast Fork Willamette. The Gettings Creek watershed is located on the east side of I-5, just north of Cottage Grove. The watershed is approximately 10,000 acres (60% forest, 20% rural residential, and 20% agricultural). Agriculture in the watershed is mainly cattle and small acreage livestock owners. Parameters of concern identified for the Gettings Creek Watershed were temperature and *E. coli.* Evaluation will be conducted using riparian vegetation as a surrogate for temperature and presence of livestock and proximity to seasonal or perennial streams as an initial surrogate for *E. coli.*

In 2011, ODA evaluated the current condition of streamside vegetation for the Gettings Creek Watershed, using satellite images, and produced a preliminary baseline map that shows streamside conditions before delivery of technical assistance in the area of focus. The preliminary baseline assessment estimates the percent of agricultural streamsides that fall into the three streamside vegetation classes, shown in Table X.

Table 8. Feet of Streamside in Each Vegetation Class for Gettings Creek (Baseline-2011)

Streamside Vegetation Class	Gettings Creek
I - Streamsides have site-capable vegetation	8,130 feet
II - Streamsides allow streamside vegetation to establish, but the vegetation has not reached site-capable conditions	N/A
III - Agricultural activities may prevent establishment of streamside vegetation	44,725 feet

In 2011, ODA worked with the Upper Willamette SWCD developed an action plan for implementing technical assistance in the priority area. The Action Plan identifies goals (by July 2013) of 1) increasing percent site capable vegetation in riparian areas adjacent to agricultural land by 20 percent and 2) decreasing the number of landowners feeding livestock within the active floodplain by 25 percent.

In late 2011, the Upper Willamette SWCD contacted all agricultural landowners to offer technical assistance. In addition to the initial contact, the Upper Willamette SWCD invited all landowners to a workshop that was held December 15, 2011. The SWCD has also begun targeted outreach to Class III landowners. After implementing projects in the focus area, an updated map will be produced to show the new conditions. The Upper Willamette SWCD will report on progress by comparing the baseline and post-implementation percent of streamside areas in each of the three-streamside vegetation classes.

Future Priority Areas

Future priority areas are 6th field HUCs with agricultural land uses in the Management Area. ODA, the LAC, the LMA, and other partners will work together to determine the order of future priority areas, based on condition of streamside vegetation and existing contacts and relationships.

ED_454-000322884 EPA-6822_012431

For more information and background on the Priority Area Process, see Section 4.3 below. Results of the assessments and targeted assistance are reported to the LAC at the Biennial Review and are summarized in Chapter 4. The Focus Area Action Plan is provided in Appendix K.

3.3 Strategies for Area Plan Implementation

The LAC recommends that the ODA, the Upper Willamette SWCD, Watershed Councils, Oregon State University Extension, and other partners use the following strategies to help achieve the goals and objectives of this Area Plan.

To protect or improve water quality, an effective strategy must increase awareness of the problems and the range of potential solutions, motivate appropriate voluntary action, and provide for technical and financial assistance to plan and implement effective water pollution prevention and control measures. The SWCDs and other partners will cooperate to implement the following strategies at the local level with landowners:

- Prevent runoff of agricultural wastes: agricultural activities will not discharge any wastes or place waste where it is likely to run off into waters of the state.
- Prevent and control upland and cropland soil erosion using practical and available methods.
- Control active channel erosion to protect against sediment delivery to streams.
- Prevent bare areas due to livestock overgrazing near streams.
- Establish streamside vegetation along streams on agricultural properties to provide streambank stability, filtration of overland flow, and moderation of solar heating.

3.3.1 Education and Outreach

- Hold workshops on water quality issues and the conservation practices that will help improve water quality.
- Develop demonstration projects to showcase successful conservation practices and systems.
- Submit news articles and public service announcements to area newspapers, radio stations, and newsletters.
- Integrate training about the agricultural water quality program with pesticide applicator training credit hours.
- Share education materials with agribusiness field representatives, farm stores, and others having regular contact with agricultural producers.
- Develop a repository for educational and technical materials that is accessible to the public and maintained with current information. Agencies, agribusinesses, and other organizations may then refer landowners to the repository for more information. The LAC recommends that the Upper Willamette SWCD, as the Local Management Agency, serve as the repository for this information, and that as much of this information as possible be maintained on or linked to the Upper Willamette SWCD and ODA websites.

As resources allow, the SWCDs, in partnership with other agencies and local organizations, will develop educational programs to improve the awareness and understanding of agricultural water quality issues. They will strive to provide the most current information in a manner that avoids conflict and encourages cooperative efforts to solve problems. Implementation of the Area Plan is a priority element in the SWCD's Annual Work Plan and Long-Range Business Plan.

The following elements are part of an effective educational program:

- Develop an outreach strategy.

ED_454-000322884 EPA-6822_012432

- Showcase successful projects and systems by conducting tours for landowners and media.
- Recognize successful projects and systems through appropriate media and newsletters.
- Promote cooperative on-the-ground projects to solve critical problems identified by landowners/operators and in cooperation with partner organizations.
- Conduct educational programs to promote public awareness of agricultural water quality.
- Evaluate current research and scientifically valid monitoring results.

Note: we're missing formal evaluation of E&O. Do we have any ideas for this?

3.3.2 Technical Assistance

Provide technical assistance to landowners in the Management Area to help them comply with the Area Rules and develop and meet their conservation and production goals.

3.3.3 Priority Area Work

Identify and focus outreach and technical assistance work in small geographic areas to help demonstrate the rate of change in land conditions that are protective of water quality.

- Identify water quality parameter(s) of concern and a possible land condition surrogate (e.g. streamside vegetation as a surrogate for temperature).
- Compile and map available baseline land condition and water quality data.
- Conduct outreach to promote awareness of water quality issues and their solutions.
- Conduct systematic outreach to meet with landowners, assess land conditions, and offer voluntary technical assistance.
- Seek to secure necessary resources to help landowners achieve land conditions that contribute to good water quality.
- Map land conditions after two years of implementation and quantify changes from the baseline.
- Compile updated available water quality data and provide to ODA for the purpose of quantifying changes from the baseline.
- Evaluate and discuss program effectiveness at the next biennial review of the Area Plan.

3.3.4 Incentives for Voluntary Work

- Submit grant proposals to the Environmental Protection Agency, Oregon Watershed Enhancement Board, U.S. Department of Agriculture, DEQ, ODA and other organizations, that will support the adoption of voluntary conservation actions to achieve the goals and objectives of the Area Plan.
- Promote incentive-based cost-share programs to assist landowners with implementing voluntary conservation projects.

Effective water quality management depends on activities and structural measures that are the most effective, practical means of controlling and preventing pollution from agricultural activities. Appropriate management activities for individual farms may vary with the specific cropping, topographical, environmental, and economic conditions at a given site. Due to these variables, it is difficult to recommend any specific, uniform set of management activities in this document to improve agricultural water quality.

Management activities and land management changes are most effective when selected and installed as parts of a comprehensive resource management plan based on natural resource inventories and assessment of management activities.

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A detailed list of specific measures that can be used to address agricultural pollution are contained in other documents such as the NRCS Field Office Technical Guide, available for reference at the local NRCS office. Landowners and operators have flexibility in choosing management approaches to address water quality issues on their lands.

Voluntary conservation plans describe the management systems and schedule of conservation activities that the landowner will use to conserve soil, water, and related plant and animal resources on all or part of a farm unit. Landowners, operators, consultants, or technicians available through a SWCD or the NRCS may develop voluntary conservation plans. A conservation plan can be used to outline specific measures necessary to address the "Prevention and Control Measures" outlined in this Area Plan.

Conservation activities should:

- Identify priorities for management activities, including reasonable timelines.
- Control pollution as close to the source as possible.
- Improve irrigation water use and conveyance efficiency to reduce the potential of polluted return flows.
- Show reduction in potential sources of pollution through scientifically valid monitoring and periodic surveys of stream reaches and associated lands.
- Be flexible to adjust management based on feedback, or monitoring and changing environmental and economic conditions.

For a list of agencies and organizations to contact for more information about resource management, please refer to Appendix B: Educational and Technical Services for Natural Resource and Farm Management.

3.3.5 Funding

Sometimes the cost of conservation measures do not fit well with a producer's operating budget. Local, state, and federal technical and financial resources are available to improve the cost-effectiveness of protecting and improving water quality. It is not the intent of the Area Plan to impose a financial hardship on any individual. If there are potential water quality threats on their land, it is the responsibility of the landowner or operator to request technical and/or financial assistance and to develop a reasonable time frame for addressing potential water quality problems.

As resources allow, the SWCD, NRCS, and other natural resource agency staff is available to help landowners evaluate approaches for reducing runoff and soil erosion on their farms and incorporate these into voluntary conservation or water quality plans. Personnel in these offices can also design and assist with project implementation, and help identify sources of cost sharing or grant funding.

Technical and financial assistance may be available through current USDA conservation programs. Other programs that stand ready to partner for conservation include the U.S. EPA's nonpoint source implementation grants ("319 funds"), or state programs such as the OWEB grant programs, the Riparian Tax Incentive Program, and the Wildlife Habitat Conservation and Management Program.

The SWCDs will seek funding to implement the Area Plan. Funding is necessary in four main areas:

- Education: to fund workshops, tours, and development of published materials.
- Technical assistance: to hire staff to work with landowners to develop and implement solutions to agricultural water quality concerns.
- Financial assistance: to provide cost-share dollars to assist landowners to implement agricultural water quality conservation activities.

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- Monitoring: to monitor land conditions and water quality and evaluate how agricultural activities are impacting streams in the Management Area.

For sources of financial assistance, see Appendix F: Conservation Funding Programs.

3.3.6 Monitoring and Evaluation

The LAC recommends that the ODA, the Upper Willamette SWCD, and other partners submit grant proposals that support monitoring. Inventory and monitoring projects should answer the following questions:

- What are baseline levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in mainstems and tributaries of the McKenzie, Middle Fork and Coast Fork?
- What are the trends in levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in the same waterbodies?
- What are baseline summer temperature levels in mainstems and tributaries of the McKenzie, Middle Fork, and Coast Fork? What are temperature trends in the same waterbodies?
- What are sources of pollution that are impacting parameters of concern in the McKenzie, Middle Fork, and Coast Fork?
- Are particular conditions of concern actually impacting water quality in adjacent waterbodies?
- By what mechanism and to what extent do particular agricultural practices improve or degrade water quality?
- How much agricultural land is known through scientifically verifiable means to be out of compliance with the Area Rules?

For a description of monitoring and evaluation activities, see Chapter 4.

3.3.7 Safe Harbor

The LAC recommends that the ODA provide a program that protects operators if they seek technical assistance prior to any complaint, similar to programs offered by the Occupational Health and Safety Division. Landowners or operators should be required to be diligent in their efforts. The protection would pertain to administrative enforcement actions.

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Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Implementation and Accomplishments

Many conservation activities and implementation monitoring tracks have been implemented to benefit water quality. The SWCD and NRCS track activities that have been implemented through quarterly reports to ODA and through a NRCS database, respectively. Projects that have received funding from OWEB are tracked in OWEB's restoration database. In addition, partner agencies can submit reports of projects and activities in the Management Area that improve water quality.

Include the detailed accomplishments table here.

4.2 Water Quality Monitoring—Status and Trends

This is the appropriate location to include the monitoring summary table if it is filled out.

Ambient site and Oregon Water Quality Index data review, plus any additional information from SWCDs, Watershed Council, and other partners also goes here.

Statewide monitoring and evaluation of water quality and streamside conditions on agricultural lands

ODA conducts monitoring at a statewide level and analyzes other agencies' and organizations' monitoring data to answer several monitoring questions related to agriculture and water quality.

- What are current water quality and landscape conditions in agricultural areas in Oregon?
- What are water quality trends?
- How well does the existing monitoring network assess agricultural water quality trends and streamside conditions in Oregon?
- What are riparian vegetation trends along agricultural lands in Oregon?
- How do riparian conditions compare with site capabilities?
- How do riparian vegetation conditions change in aerial photos of selected stream reaches?
- How do changes in riparian vegetation condition compare with trends in water quality in monitored watersheds?

To answer these questions, ODA evaluates water quality data from existing sites in DEQ's LASAR database (http://deq12.deq.state.or.us/lasar2) that reflects agricultural influence on water quality. In 2011, ODA received funding from the Oregon Legislature to fund water quality sampling at 19 additional sites around Oregon. These data, once sampling begins, will also be published in the LASAR database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide.

For each Management Area, ODA currently evaluates other agencies' and organizations' water quality data to answer the following questions.

- What water quality and land condition data from agricultural watersheds are available?
- What are trends in available water quality and land condition data in agricultural watersheds since Area Plan and Rule adoption, and since the last biennial review?

Data are reviewed every two years and summarized to the LACs and LMA during the biennial review process. Data summaries are also added to the Water Quality Issues section of the plan.

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The Oregon Department of Environmental Quality maintains several long-term water quality monitoring sites in the management area. These include the Coast Fork Willamette at Mt. Pisgah Park, the McKenzie River at Coburg Road, the Willamette River at Highway 126 in Springfield, the Middle Fork Willamette at Jasper Bridge, the McKenzie River at Hendricks Bridge, and the McKenzie River at McKenzie Bridge. Of these sites, ODA considers the Coast Fork Willamette at Mt. Pisgah Park and Willamette River at Highway 26 to reflect predominantly agricultural influence. While agricultural activities also influence water quality at the other sites, it is difficult to separate the agricultural influences from urban and other influences.

In January 2012, the Oregon DEQ published the Oregon Water Quality Index Summary Report. The Oregon Department of Environmental Quality uses the Oregon Water Quality Index to characterize water quality at its long-term monitoring sites for the 2001-2010 water years. The index analyzes water quality variables and produces a score describing general water quality. The index is unitless, with scores ranging from 10 (very poor) to 100 (excellent).

Out of the six DEQ sites in the management area, five sites, including the Willamette River at Highway 126 site, received scores ranging from 91 to 93, which are classified as excellent. The Coast Fork Willamette at Mt. Pisgah Park received a score of 88, which is considered good. Water quality at the two agriculturally influenced sites did not significantly improve or worsen over the 10-year period.

ODA received funding during the 2011 legislative session to add agricultural sites to DEQ's monitoring network, and is contracting with DEQ to conduct that sampling. One of the new sites is located on the Mohawk River. Data collection at this site began in early 2012, and data from this site will be included in the water quality data summary during the next biennial review.

The United States Geological Survey (USGS) and the Eugene Water and Electric Board (EWEB) have done some testing in the Management Area for pesticides and other industrial chemicals and their by-products. These monitoring efforts focus on collecting water samples during storm runoff from various land use types (forestry, urban, agriculture) to evaluate the mobilization of pollutants during major precipitation events. Unfortunately, the sampling has been unable to isolate the influence from agricultural areas. The sites that have been used to sample for agricultural use also tend to have influence from residential and forest areas. EWEB is planning to continue conducting monitoring in an attempt to isolate the influence from agriculture. Many of these products are relatively soluble in water, while others attach strongly to soil particles. They are transported from the land surface to streams through a combination of subsurface drainage, surface runoff, and soil erosion. Infiltration of rain and irrigation water facilitate transport to groundwater (United States Geological Survey, 1998)

The Eugene Water and Electric Board conducted a "Nonpoint Source Pollution Assessment and Evaluation" in 2004 and 2005. This project attempted to evaluate nonpoint pollution sources, including agriculture, forestry, septic systems, and construction activities. The main objective was to bring watershed landowners, agencies, businesses, and other stakeholders together to discuss these issues and attempt to reduce the threats of non-point pollution from these activities.

The main objectives of the agricultural assessment were to develop an inventory of agricultural activities, determine high priority areas, and to identify problems through water quality monitoring. The majority of the evaluation work was conducted using geographic information systems (GIS). Agricultural fields were digitized in GIS using aerial photography and then ground-truthed to enhance the accuracy of the crop data. Chemical applications were estimated using application rates and acreages of each crop. Based on this analysis, it was determined that over 8,000 lbs. of chemical active ingredients are applied in the McKenzie Basin annually. The GIS analysis also identified two priority areas with a higher potential of pesticide run-off. The first area is land near the confluence of Cedar Creek and the McKenzie River and

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the second area is between EWEB's Walterville Power Canal and the McKenzie River. These are two areas with more intensive agricultural practices. Hazelnuts, nursery operations, blueberries, and vegetable crops were identified as the four highest chemical usage crops in the area. The overall results of the water quality monitoring indicate no major impacts from nonpoint sources of pollution in the area (Morgenstern, 2006).

The Eugene Water and Electric Board conducted water quality monitoring at 13 sites in the McKenzie River between 2000 and 2009. Sites in Camp Creek, Cedar Creek, the Mohawk River, and the lower McKenzie River had the most agricultural land within the watershed. Monitoring data showed excellent water quality in the McKenzie River. However, some potential water quality concerns were also identified in tributaries in the lower watershed. Camp Creek, Cedar Creek, and Keizer Slough (which is not agriculturally influenced) showed the highest concentrations of nitrates, total phosphorus, metals, *E. coli*, total organic carbon, total suspended solids, total coliform and specific conductance. Nitrate levels in Camp Creek declined over the duration of the monitoring period. Camp Creek, Cedar Creek, and the lower Mohawk River had the highest levels of *E. coli*, which sometimes violated Oregon's water quality standards.

Between 2008 and 2010, the Middle Fork, Coast Fork, and Long Tom watershed councils collaborated to evaluate water quality above and below eight small communities in Lane County. Some of the monitoring data were gathered in streams with significant agricultural influence. Monitoring results relevant to agriculture are summarized below.

In the Middle Fork Willamette, upstream and downstream samples were collected on Lost Creek and Little Fall Creek. Both of these watersheds include some agricultural land, as well as residential and forest lands. Lost Creek data showed temperature and dissolved oxygen concerns during the monitoring period, with relatively infrequent bacteria concerns at the downstream site. Little Fall Creek showed temperature and dissolved oxygen concerns, but met state bacteria standards consistently.

In the Coast Fork Willamette, Hill Creek, Camas Swale, Gettings Creek, and Mosby Creek were the streams monitored that have significant agricultural land. Gettings Creek had greater water quality concerns than the other streams in the study, with temperature and bacteria concerns at the lower site and an increase in water quality concerns between the upstream and downstream sites.

4.3 Progress Toward Measurable Objectives

This may include a Management Area and Focus Area discussion.

Land Condition Assessment

ODA will work with LMAs and other partners to design and conduct an assessment of streamside areas along agricultural lands in the management area prior to the next biennial review. These assessments will allow ODA and partners to track improvements in land conditions over time. Often, improvements in land conditions are detectable much earlier than changes in water quality. For example, when a landowner restores a streamside area, land conditions improve rapidly, even though it may take 20 years for streamside vegetation to reach the height that it can positively affect stream temperatures.

Implementation Activities Assessment

In addition, during the biennial review process, ODA, the LMA, and the LAC assess activities that have occurred to help achieve plan goals and objectives, including the following.

ED_454-000322884 EPA-6822_012438

- Outreach and education activities conducted to promote awareness of water quality issues and encourage agricultural land conditions that protect water quality, and the level of participation in these activities.
- Voluntary conservation projects installed by agricultural landowners and managers in cooperation with the LMA and other agencies and organizations.
- Number of complaint investigations, the result of each complaint investigation, and corrections of violations.

Area Plan and Rules Effectiveness Evaluation

The LAC, ODA, and the LMA will evaluate the effectiveness of the Area Plan in improving water quality and land conditions, include the evaluation results in the next update of the Area Plan, and summarize the results in a biennial report to the Oregon Board of Agriculture. ODA, the LMA, and the LAC will discuss the monitoring and evaluation results at the next biennial review, what these results mean in terms of Area Plan effectiveness, and modifications to the Area Plan and Rules. Some of the questions to consider in the discussions include:

- Are all of our goals and objectives measurable?
- Were the activities that we committed to do over the previous two years in our goals, objectives, and strategies accomplished?
- Were all violations that were found during investigations resolved or are they in the process of being resolved?
- Were our goals and objectives for land condition improvements met?
- Are water quality data from agricultural lands showing improvement?
- How do water quality and land condition data trends compare? Do we need to start collecting other kinds of land condition data?

Documenting Effectiveness Using Priority Areas

Why Focus Efforts in a Priority Area?

The Oregon Agricultural Water Quality Program relies primarily on voluntary improvements in land conditions for agriculture to fulfill its responsibility to prevent and control water pollution. One way to implement an Area Plan systematically is to focus and measure implementation in relatively small regions within the Management Area.

The priority area concept evolved from conversations between ODA, LMAs, LACs, and other stakeholders and partners seeking better ways to implement the Agricultural Water Quality Program and Area Plans. ODA and program partners believe that strategic, focused, and systematic delivery of outreach and technical assistance will lead to more measurable levels of implementation and allow ODA and the LMA to make better use of limited resources.

While the priority area approach is relatively new for ODA, the LMA, and the LAC, it is consistent with other agencies' and organizations' efforts to work proactively in targeted geographic areas.

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Selecting A Priority Area

A priority area is usually a small watershed (6th or 7th field HUC) with agricultural lands. An initial priority area is selected jointly by ODA, the LMA, the LAC, and other partners, based on one or more of the following factors:

- Significant water quality concerns probably associated with agricultural activities.
- LMA and other partners are already working with landowners in an area.
- Size of the area matches the LMA's capacity to work in the entire area in a relatively short time frame.

During the 2012 biennial review process, ODA, the LMA, and the LAC discussed the priority area concept, an initial priority area, future priority areas, measurable objectives for implementation in the priority area, and timelines for implementation. The initial and future priority areas for the Management Area are described in the Strategies section of this Area Plan.

Land Condition and Water Quality

Once a priority area is selected, land condition measures are identified for which baseline and post-implementation data will be collected and mapped. These land condition measures serve as surrogates for the water quality parameters of concern in the priority area. For example, streamside vegetation is generally used as a surrogate for water temperature, sediment may be used as a surrogate for pesticides and mercury, and livestock access to waterways could be used as a surrogate for bacteria. Water quality monitoring data may also help partners evaluate the effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides, to evaluate progress in the priority area and to help identify future priority areas.

The Oregon Agricultural Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over land conditions.
- It can be difficult to separate agriculture's influence on water quality data from other influences, such as bacteria from failing septic systems, wildlife, and recreation.
- Other factors such as climate change may have long-term impacts on water quality that are beyond agriculture's control.
- It is expensive to monitor water quality at the scale needed to evaluate effectiveness.
- Changes in land conditions, such as streamside vegetation, will take a long time to translate into water quality improvements.

Focused Outreach and Technical Assistance

After baseline streamside conditions are mapped, the LMA and other interested partners deliver focused and systematic outreach and technical assistance to landowners in the priority area. Every landowner with potential land condition concerns is contacted with an offer of voluntary assistance. Focused, one-on-one (active) outreach and technical assistance efforts are often more effective in reaching landowners than general (passive) outreach. This focused program delivery will allow ODA, the LMA, and the LAC to implement the Area Plan systematically by moving focused work from one small watershed to the next over time, eventually reaching the entire Management Area.

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Monitoring and Evaluation

ODA, the LMA, and the LAC will evaluate and document the implementation of the Area Plan by assessing improvement of land conditions in the priority area during each biennial review. Comparisons of baseline and post-implementation land conditions (along with available water quality data) will allow these partners to determine whether the selected land condition measures have improved. These partners and other stakeholders will also be able to evaluate the status and trends of Area Plan implementation more readily than from reports of implementation efforts scattered throughout a Management Area.

The priority area process will help ODA, the LMA, the LAC, and other program partners to evaluate whether implementation of the Agricultural Water Quality Program is achieving the measurable objectives in the Area Plan, such as:

- Achieve X% compliance with the Area Rules over Z years
- Achieve Y% water-quality protective vegetation over Z years

Stream Temperature and Streamside Vegetation

Across Oregon's 38 Water Quality Management Areas, many LMAs are focusing their initial priority area implementation on streamside vegetation. There are several reasons for this focus:

- Streamside vegetation improves water quality for multiple parameters, including temperature, sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation is visible from public roads and on aerial photos, allowing agencies, stakeholders, and the general public to see that agriculture is part of the solution.
- Landowners can take steps to improve streamside vegetation, with or without assistance from the LMA, watershed councils, or other local partners.
- Streamside vegetation improves fish and wildlife habitat.

The Oregon Agricultural Water Quality Program usually uses the concept of "site-capable streamside vegetation" to describe the vegetation that agricultural streamsides need in order to prevent and control water pollution. Site-capable streamside vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g. elevation, soils, climate, wildlife, fire, floods) and historical and current human influences (e.g. channelization, roads, invasive species, land management). Site-capable streamside vegetation can be determined for a specific site based on: streamside vegetation at the site (type, location, and size), streamside vegetation at nearby reference sites (with similar natural characteristics), or NRCS soil surveys (which often describe the vegetation in uncultivated areas).

Mature, site-capable streamside vegetation usually provides three functions that help to prevent or control water pollution from agricultural activities:

1. Shade that blocks direct solar radiation and moderates stream temperatures.
2. Bank stability and reduction of streambank erosion.
3. Filtration of pollutants (e.g. bacteria, nutrients, pesticides, mercury, sediment) from overland flows.

However, in some cases mature site-capable vegetation may not be needed to provide these functions, or may not provide these functions. For example:

- Mature trees may not be necessary to protect water quality; willows or other shrubs may suffice on small streams.
- Mature conifers may shade crops or create undesirable microclimates; mature alders may be an adequate alternative.

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- Mature juniper is site-capable vegetation in central and eastern Oregon, but it reduces bank stability and increases erosion.
- Invasive grasses (such as reed canary grass or Kentucky bluegrass) can be the dominant site-capable vegetation along streams, but they generally do not provide all of the required water quality functions.
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality.

To measure baseline conditions in the priority area, the LMA will map streamside areas on agricultural lands and estimate the percentage of streamside areas that fall into four categories, referred to as Class I, II, III, and IV in this Area Plan (Table 2).

Table 9. Classes of Streamside Vegetation for Assessing Land Conditions.

Class	Water-Quality Protective Vegetation	Agricultural Impacts	Three Functions Provided
I	Present	None	All three
II	Establishing and growing	None	Depends on size / location / density of vegetation
III	Unable to establish	Prevent vegetation from establishing	No
IV	Unable to establish	None – non ag factors prevent vegetation from establishing	No

Every two years, ODA, the LMA, and the LAC will evaluate the progress of Area Plan implementation in the priority area. The percentage of streamside areas that fall into the four classes will be updated. Streamside areas can be reclassified from Class III to Class II where projects remove agricultural impacts and allow streamside vegetation to establish. Reclassification from Class II to Class I will usually take longer than two years, because streamside vegetation needs to grow to a height where it can provide shade and other functions.

Placeholder - Source assessment/discussion
What are the ag sources that are contributing to the status and trends that we observe? Should we at least revisit that section of the plan, given the data? Is there a way to make those sections more specific, either geographically or by activity? For example, is winter feeding more of a contributor? Do existing data support the assumptions that the plan has already made about agricultural sources? What data are needed to further assess the relative importance and geographic distribution of the sources?

Placeholder - What do water quality and land condition data tell us about where work should be focused and what issues work should focus on?

- Summarize source/priority identification data collected by watershed councils, SWCDs, DEQ, etc.
- If DEQ, watershed council, or other data indicate water quality problems, what are the potential agricultural sources of these problems?
- What types of objectives and strategies should we identify for the next two years to address the agricultural sources of those problems?

Is additional water quality or landscape monitoring needed to identify areas where focused work is needed?

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4.4 Aerial Photo Monitoring of Streamside Vegetation

Put results here.

4.5 Biennial Reviews and Adaptive Management

A summary of the biennial review and resulting recommendations goes here.

Topics for discussion during the biennial review may include the following:

1) *Land condition and water quality monitoring:*
   - *Status and trends in agricultural land conditions.*
   - *Status and trends in water quality data for agricultural areas.*
   - *Comparison of trends in land condition with trends in water quality.*
   - *Addressing gaps in the existing land condition or water quality monitoring network.*
2) *Area Plan changes:*
   - *New point- nonpoint-source programs. (We regulate point sources too, e.g., horse facilities that CAFO elects not to permit.)*
   - *Rule changes.*
   - *Improvements needed to meet water quality standards.*
3) *Area Plan implementation progress and effectiveness:*
   - *Progress toward meeting goal(s) and measurable objectives.*
   - *Implementation of specific conservation strategies and appropriate best management practices for source control.*
   - *Effectiveness of voluntary actions (through outreach, education, landowner contacts, and technical and financial assistance) in addressing water quality concerns. Note: we still need a way to measure the effectiveness of our voluntary actions.*
   - *Data gaps.*
4) *Regulations:*
   - *Number and nature of compliance cases.*
   - *Outcome or resolution of compliance cases.*
   - *Effectiveness of regulatory actions in addressing water quality concerns.*
5) *Outreach:*
   - *Events held.*
   - *Number of landowners.*
   - *Number of site visits of projects.*

ED_454-000322884 EPA-6822_012443

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Appendices

Common Agricultural Water Quality Parameters of Concern

Sources of Information and Technical Assistance

2010 Water Quality Assessment List and Decision Matrix

Water Quality Parameters List and Affected Beneficial Uses

Pesticide Use in Oregon

Conservation Funding Programs

Revised Universal Soil Loss Equation (RUSLE)

ORS 468B.025 and 468B.050

References on Water Quality Improvement Practices for Agricultural Landowners

Where Does the 25-year Storm Event Requirement come from in the Riparian Characteristic to Achieve?

Gettings Creek Focus Area Action Plan

ED_454-000322884 EPA-6822_012446

ED_454-000322884 EPA-6822_012447

Appendix A: Common Agricultural Water Quality Parameters of Concern

The following parameters are used by DEQ in establishing the 303(d) List and assessing and documenting waterbodies with TMDLs. Note: This is an abbreviated summary and does not contain all parameters or detailed descriptions of the parameters and associated standards. Specific information about these parameters and standards can be found at: www.deq.state.or.us/wq/assessment/assessment.htm or by calling (503) 229-6099.

Parameters

Template Language

Descriptions of Common Agricultural Parameters of Concern: This language can be used or added to existing language.

Bacteria: *Escherichia coli (E. coli)* is measured in streams to determine the risk of infection and disease to people. Bacteria sources include humans (recreation or failing septic systems), wildlife, and agriculture. On agricultural lands, E. coli generally comes from livestock waste, which is deposited directly into waterways or carried to waterways by livestock via runoff and soil erosion. Runoff and soil erosion from agricultural lands can also carry bacteria from other sources.

Biological Criteria: To assess a stream's ecological health, the community of benthic macro invertebrates is sampled and compared to a reference community (community of organisms expected to be present in a healthy stream). If there is a significant difference, the stream is listed as water quality limited. These organisms are important as the basis of the food chain and are very sensitive to changes in water quality. This designation does not always identify the specific limiting factor (e.g., sediment, nutrients, or temperature).

Dissolved Oxygen: Dissolved oxygen criteria depends on a waterbody's designation as fish spawning habitat. Streams designated as salmon rearing and migration are assumed to have resident trout spawning from January 1 – May 15, and those streams designated core cold water are assumed to have resident trout spawning January 1 – June 15. During non-spawning periods, the dissolved oxygen criteria depends on a stream's designation as providing for cold, cool or warm water aquatic life, each defined in OAR 340 Division 41.

Harmful Algal Blooms: Some species of algae, such as cyanobacteria or blue-green algae, can produce toxins or poisons that can cause serious illness or death in pets, livestock, wildlife, and humans. As a result, they are classified as Harmful Algae Blooms. Several beneficial uses are affected by Harmful Algae Blooms: aesthetics, livestock watering, fishing, water contact recreation, and drinking water supply. The Public Health Department of the Oregon Health Authority is the agency responsible for posting warnings and educating the public about Harmful Algae Blooms. Under this program, a variety of partners share information, coordinate efforts and communicate with the public. Once a water body is identified as having a harmful algal bloom, DEQ is responsible for investigating the causes, identifying sources of pollution and writing a pollution reduction plan.

Mercury: Mercury occurs naturally and is used in many products. It enters the environment through human activities and from volcanoes, and can be carried long distances by atmospheric air currents. Mercury passes through the food chain readily, and has significant public health and wildlife impacts from consumption of contaminated fish. Mercury in water comes from erosion of soil that carries

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naturally occurring mercury (including erosion from agricultural lands and streambanks) and from deposition on land or water from local or global atmospheric sources. Mercury bio-accumulates in fish, and if ingested can cause health problems.

Nitrate: While nitrate occurs naturally, the use of synthetic and natural fertilizers can increase nitrate in drinking water (ground and surface water). Applied nitrate that is not taken up by plants is readily carried by runoff to streams or infiltrate to ground water. High nitrate levels in drinking water cause a range of human health problems, particularly with infants, the elderly, and pregnant and nursing women.

Pesticides: Agricultural pesticides of concern include substances in current use and substances no longer in use but persist in the environment. Additional agricultural pesticides without established standards have also been detected. On agricultural lands, sediment from soil erosion can carry these pesticides to water. Current use agricultural pesticide applications, mixing-loading, and disposal activities may also contribute to pesticide detections in surface water. For more information, see: www.deq.state.or.us/wq/standards/toxics.htm.

Phosphorous/Algae/pH/Chlorophyll a: Excessive algal growth can contribute to high pH and low dissolved oxygen. Native fish need dissolved oxygen for successful spawning and moderate pH levels to support physiological processes. Excessive algal growth can also lead to reduced water clarity, aesthetic impairment, and restrictions on water contact recreation. Warm water temperatures, sunlight, high levels of phosphorus, and low flows encourage excessive algal growth. Agricultural activities can contribute to all of these conditions.

Sediment and Turbidity: Sediment includes fine silt and organic particles suspended in water, settled particles, and larger gravel and boulders that move at high flows. Turbidity is a measure of the lack of clarity of water. Sediment movement and deposition is a natural process, but high levels of sediment can degrade fish habitat by filling pools, creating a wider and shallower channel, and covering spawning gravels. Suspended sediment or turbidity in the water can physically damage fish and other aquatic life, modify behavior, and increase temperature by absorbing incoming solar radiation. Sediment comes from erosion of streambanks and streambeds, agricultural land, forestland, roads, and developed areas. Sediment particles can transport other pollutants, including bacteria, nutrients, pesticides, and toxic substances.

Temperature: Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Several temperature criteria have been established to protect various life stages and fish species. Many conditions contribute to elevated stream temperatures. On agricultural lands, inadequate streamside vegetation, irrigation water withdrawals, warm irrigation water return flows, farm ponds, and land management that leads to widened stream channels contribute to elevated stream temperatures. Elevated stream temperatures also contribute to excessive algal growth, which leads to low dissolved oxygen levels and high pH levels.

ED_454-000322884 EPA-6822_012449

Appendix B: Sources of Information and Technical Assistance

Upper Willamette Soil and Water Conservation District (Upper Willamette SWCD)
(formerly the East Lane SWCD)
780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6436
Provides technical assistance in a wide variety of agricultural and natural resource areas and assists landowners in accessing federal and local funding programs.

Farm Services Agency (FSA)
780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443
Maintains agricultural program records and administers federal cost-share programs. Maintains up-to-date aerial photographs and slides of agricultural and forest lands.

Lane County Farmers' Market
55 East 8th Avenue
Eugene, OR 97401
(541) 687-6721
Local produce directly from farmers. Many experienced organic growers onsite.

McKenzie River Trust
1245 Pearl Street
Eugene, OR 97401
(541) 345-2799
mrt@mckenzieriver.org
www.mckenzieriver.org
Local, non-profit land conservancy that works with landowners in Lane and Douglas Counties to preserve their property. Employs several tools to help landowners protect lands critical to water quality and wildlife habitat.

Natural Resources Conservation Service (NRCS)
780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443
Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing conservation plans for federal programs such as the Conservation Reserve Program, Conservation Reserve Enhancement Program, the Environmental Quality Incentives Program, and the Wetlands Reserve Program. Makes technical determinations on wetlands and highly erodible lands.

Northwest Coalition for Alternatives to Pesticides (NCAP)
P.O. Box 1393
Eugene, OR 97440
(541) 344-5044
http://www.pesticide.org
info@pesticide.org
Works to protect people and the environment by advancing healthy solutions to pest problems. Has a library of over 15,000 articles, documents and books on pesticide issues, the health and environmental

ED_454-000322884 EPA-6822_012450

effects of pesticides, and alternative practices. Provides information on managing a specific pest problem or crop without the use of pesticides. Has water quality program and can provide information on protection of waterways and research on pesticide contamination of waterways.

Oregon Department of Agriculture (ODA)
635 Capitol St NE
Salem, OR 97301
Natural Resources Division: (503) 986-4700
Pesticides Division: (503) 986-4635
The Natural Resources Division is responsible for developing and implementing Management Area Plans and Rules across Oregon, the Confined Animal Feeding Operation Program, and for providing support to Oregon's SWCDs.

The Pesticides Division regulates the sale and use of pesticides; tests and licenses all users of restricted-use pesticides, is responsible for fertilizer registration, and investigates incidents of alleged pesticide misuse.

Oregon Department of Environmental Quality (DEQ)
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
Responsible for protecting Oregon's water and air quality, cleaning up spills and releases of hazardous materials, and managing the proper disposal of solid and hazardous wastes. Maintains a list of water quality limited streams and establishes Total Maximum Daily Loads for water quality limited waterbodies.

Oregon Department of Fish and Wildlife (ODFW)
Springfield Field Office
3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3515
http://www.dfw.state.or.us
Works with landowners to protect and enhance habitat for a variety of fish and wildlife species, manages recreational fishing and hunting programs, monitors fish and wildlife populations, conducts education and information programs, and administers wildlife habitat tax deferral program.

Oregon Department of Forestry (ODF)
Veneta office:
87950 Territorial HWY
Veneta, OR 97487
(541) 935-2283

Springfield office:
3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3588
http://www.odf.state.or.us
Implements Oregon forest practices laws, administers Oregon forestry property tax programs, provides forest management technical assistance to landowners, and administers or assists with several federal and local cost-sharing programs.

ED_454-000322884 EPA-6822_012451

Oregon Department of State Lands (DSL)
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
http://statelands.dsl.state.or.us
Administers Oregon fill and removal law and provides technical assistance to landowners.

Oregon State University Extension Service (OSU Extension Service)
783 Grant Street
Eugene, OR 97402
(541) 344-5859
http://extension.oregonstate.edu/lane
Offers educational programs, seminars, classes, tours, publications, and individual assistance to guide landowners in meeting natural resource management goals.

Oregon Tilth
260 SW Madison Avenue, Suite 106
Corvallis, OR 97333
(503) 378-0690
http://www.tilth.org
Oregon Tilth is the Northwest certifying agency for organic farms. Maintains a manual on acceptable practices and visits farms to determine compliance. Also publishes "In Good Tilth" and maintains a list of currently certified farmers.

Oregon Water Resources Department (WRD)
725 Summer Street NE, Suite A
Salem, OR 97301
(503) 986-0900
http://www.wrd.state.or.us
Provides information on streamflows and water rights, issues water rights, and monitors water use.

Oregon Watershed Enhancement Board (OWEB)
http://www.oweb.state.or.us
775 Summer St. NE, Suite 360
Salem, OR 97301-1290
(503) 986-0178
Provides funding for a variety of watershed enhancement, assessment, monitoring and educational activities. Provides support to watershed councils throughout Oregon.

ED_454-000322884 EPA-6822_012452

Watershed Councils
Bring diverse interests together to cooperatively monitor and address local watershed conditions. Collect watershed condition data, conduct education programs, and train and involve volunteers.

McKenzie Watershed Council
P.O. Box 70166
Springfield, OR 97475
(541) 687-9076
www.mckenziewc.org
coordinator@mckenziewc.org

Coast Fork Watershed Council
28 South 6th Street, Suite A
Cottage Grove, OR 97424
(541) 767-9717
www.coastfork.org

Middle Fork Watershed Council
P.O. Box 27
Lowell, OR 97452
(541) 937-9800
www.mfwwc.org
contact@mfwwc.org

Mohawk Watershed Partnership
P.O. Box 615
Marcola, OR 97454-0615
(541) 687-9076
mwp@epud.nethttp://www.mckenziewc.org/mohawkWSP.html

Lost Creek Watershed Group
PO Box 27
Lowell, OR 97452
(541) 937-3351
mfwwc@efn.org

ED_454-000322884 EPA-6822_012453

Appendix C: 2010 Water Quality Assessment List and Decision Matrix

"TMDL" means a TMDL has been established for the waterbody and approved by EPA, and is being implemented. The TMDL is the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. The water is considered Water Quality Limited until it meets the water quality standard.

"303(d) List" means the waterbody exceeds listing criteria and is placed on the 303(d) List.

"Potential concern" means data indicate a waterbody may typically meet water quality standards except under unusual circumstances (e.g. unusual weather circumstances) or in situations where toxics exceed levels of concern but do not exceed definitions used for the 303(d) List. In these cases, the waterbodies are identified as being of potential concern and the Department of Environmental Quality will seek more data to verify the assessment.

BACTERIA (CRITERIA: WATER CONTACT RECREATION)

TMDL Approved September 2006

DEQ has set the bacteria TMDL to protect human water contact recreation, the most sensitive beneficial use. Urban stormwater discharge and agricultural run-off are two potential sources of bacteria. The bacteria TMDL addresses the entire area.

DISSOLVED OXYGEN

TMDL Approved, 1996
Coast Fork Willamette River, River Mile (RM) 0 to 28.5

303(d) List	**Season**
Middle Fork Sub Basin:	
Anthony Creek, Mouth to RM 4.3	Oct. 1 – May 31
Anthony Creek, Mouth to RM 4.3	June 1 – Sept. 30
Lost Creek, Mouth to RM 14.7	Oct. 1 – May 31
Lost Creek, Mouth to RM 14.7	June 1 – Sept. 30
Coast Fork Sub Basin:	
Camas Swale Creek, Mouth to RM 9.4	Oct. 1 – May 31

TEMPERATURE (CRITERIA: REARING 64 F, SPAWNING 55 F, OR BULL TROUT 50 F)

DEQ set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Southern Willamette Valley Management Area. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities. There are separate temperature TMDLs for the mainstem Willamette, the McKenzie Subbasin, the Middle Fork Willamette Subbasing, and the Coast Fork Willamette Subbasin

ED_454-000322884 EPA-6822_012454

303(d) List (covered under the TMDL)	Season
McKenzie Sub Basin:	
Blue River-RM 0 to 15.5	Year Round
Budworm Creek, RM 0 to 3.1	Year Around
Camp Creek, RM 0 to 10.9	Year Around
Cartright Creek, RM 0 to 6.1	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Deer Creek, RM 0 to 2.6	Year Around
Duckpen Creek, RM 0 to 2.1	Year Around
Horse Creek, RM 0 to 14.2	Summer
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McGowan Creek, RM 0 to 5.7	Year Around
McKenzie River, RM 0 to 54.6	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Rebel Creek, RM 0 to 1.2	Year Around
Rush Creek, RM 0 to 2.4	Year Around
Seeley Creek, RM 0 to 2.4	Year Around
Shotgun Creek, RM 0 to 6.6	Year Around
South Fork McKenzie River, RM 0 to 4.5	Summer
Middle Fork Willamette:	
Anthony Creek, RM 0 to 4.3	Year Around
Bohemia Creek, RM 0 to 4.4	Year Around
Buckhead Creek, RM 0 to 3.6	Year Around
Chalk Creek, RM 0 to 4.8	Year Around
Christy Creek, RM 0 to 12	Year Around
Coal Creek, RM 0 to 8.9	Year Around
Coal Creek Trib., RM 0 to 2.2	Year Around
Eagle Creek, RM 0 to 5.3	Year Around
Fall Creek, RM 0 to 32.8	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Gold Creek, RM 0 to 5.1	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Guiley Creek, RM 0 to 4.7	Year Around
Hehe Creek, RM 0 to 6.6	Year Around
Hills Creek, RM 0 to 15.3	Year Around
Indian Creek, RM 0 to 4.3	Year Around
Little Fall Creek, RM 0 to 20.6	Year Around
Logan Creek, RM 0 to 3.6	Year Around
Lost Creek, RM 0 to 14.7	Year Around
McKinley Creek, RM 0 to 3.8	Year Around
Middle Creek, RM 0 to 3.8	Year Around
Middle Fork Willamette, RM 52.3 to 82.2	Year Around
Mike Creek, RM 0 to 2.2	Year Around
Monterica Creek, RM 0 to 2.3	Year Around
N. Fork, Middle Fork Willamette River, RM 0 to 28.3	Year Around
N. Fork Winberry Creek, RM 0 to 5.8	Year Around
Packard Creek, RM 0 to 5.2	Summer

ED_454-000322884 EPA-6822_012455

Portland Creek, RM 0 to 3	Summer
Salt Creek, RM 0 to 13.8	Year Around
Shortridge Creek, RM 0 to 2	Year Around
Snake Creek, RM 0 to 3.6	Year Around
South Fork Winberry Creek, RM 0 to 9.5	Year Around
Wall Creek, RM 0 to 6.6	Year Around
Winberry Creek, RM 0 to 8	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Summer
Coast Fork Willamette, RM 0 to 38.8	Year Around
King Creek, RM 0 to 3.2	Year Around
Laying Creek, RM 0 to 14.4	Year Around
Marten Creek, RM 0 to 3.4	Year Around
Mosby Creek, RM 0 to 21.2	Year Around
Row River, RM 0 to 20.8	Year Around
Sharps Creek, RM 0 to 15,2	Year Around

Potential Concern	**Season**
McKenzie Sub Basin:	
Augusta Creek, RM 0 to 7.1	Summer
Middle Fork Willamette:	
Salt Creek, South Fork, RM 0 to 6.6	Summer

METALS

Mercury TMDL

Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. The Mercury TMDL has a basin wide strategy for mercury reduction.

303(d) List	**Season**
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5 (Manganese)	Year Around
Mohawk River, RM 0 to 25.4 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Iron)	Year Around
Coast Fork Willamette River, RM 0 to 38.8 (Mercury)	Year Around
Cottage Grove Reservoir (Mercury)	Year Around
Dennis Creek, RM 0 to 1.4 (Mercury)	Year Around
Dorena Reservoir (Mercury)	Year Around

Potential Concern	
McKenzie Sub Basin:	
McKenzie RiverRM 0 to 83 (Arsenic)	
McKenzie River, RM 0 to 34.1 (Chromium)	Year Around

ED_454-000322884 EPA-6822_012456

McKenzie River, RM 0 to 34.1 (Copper)	Year Around
McKenzie River, RM 0 to 19.7 (Iron)	Year Around
McKenzie River, RM 0 to 34.1 (Manganese)	Year Around
McKenzie River, RM 0 to 34.1 (Nickel)	Year Around
South Fork McKenzie River, RM 0 to 36.3 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Manganese)	Year Around

FLOW MODIFICATION

303 (d) List	**Season**
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Undefined
Camp Creek, RM 0 to 10.8	Undefined
McKenzie River, RM 34.1 to 54.5	Undefined
South Form McKenzie River, RM 0 to 4.5	Undefined
Middle Fork Willamette:	
Fall Creek, RM 0 to 7 and 13 to 32.7	Undefined
Middle Fork Willamette River, RM 0 to 15.6 and 18.7 to 44.2	Undefined
Coast Fork Willamette:	
Coast Fork Willamett, RM 0 to 31.3	Undefined
Row River, RM 0 to 7.4	Undefined

HABITAT MODIFICATION

303 (d) List	**Season**
McKenzie Sub Basin:	
Mill Creek, RM 0 to 2.7	Undefined
Mohawk River, RM 0 to 25.4	Undefined
Middle Fork Willamette:	
Little Fall Creek, RM 0 to 20.6	Undefined
Simpson Creek, RM 0 to 5	Undefined
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Undefined
Mosby Creek, RM 0 to 21.2	Undefined
Sharps Creek, RM 0 to 12.5	Undefined

ED_454-000322884 EPA-6822_012457

AQUATIC WEEDS OR ALGAE

303 (d) List	Season
McKenzie Sub Basin:	
Blue River/Blue River Reservoir	Undefined
Middle Fork Willamette:	
Middle Fork Willamette/Dexter Reservoir	Undefined
Middle Fork Willamette/Hills Creek Lake	Undefined
Middle Fork Willamette/Lookout Point Lake	Undefined
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 31.3	Undefined
Row River/Dorena Lake	Undefined

NUTRIENTS

TMDLs Approved

Coast Fork Willamette-Mouth to Cottage Grove Reservoir (Phosphorus)
Coast Fork Willamette-Mouth to Cottage Grove Res. (Water-Ammonia)
Coast Fork Willamette, RM 0 to 31.3 (pH)

Potential Concern

McKenzie River, RM 73.4 to 84.8 (Phosphorus)

ALKALINITY

Potential Concern	Season
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McKenzie River, RM 0 to 84.8	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Parsons Creek, RM 0 to 6.9	Year Around
Rebel Creek, RM 0 to 4.4	Year Around
Roney Creek, RM 0 to 2.7	Year Around
Rush Creek, RM 0 to 2.4	Year Around
South Fork McKenzie River, RM 0 to 36.3	Year Around
Middle Fork Willamette:	
Black Creek, RM 0 to 13.6	Year Around
Eighth Creek, RM 0 to 2.7	Year Around
Furnish Creek, RM 0 to 5.2	Year Around

ED_454-000322884 EPA-6822_012458

Little Fall Creek, RM 0 to 20.6	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
North Fork Winberry Creek, RM 0 to 5.8	Year Around
Shady Creek, RM 0 to 1.7	Year Around
Timber Creek, RM 0 to 2.7	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 15.5	Year Around
Coast Fork Willamette River, RM 0 to 28.3	Year Around
Row River, RM 0 to 20.8	Year Around

BIOLOGICAL CRITERIA

Potential Concern	**Season**
McKenzie Sub Basin:	
Cash Creek, RM 0 to 6.1	Year Around
Hardy Creek, RM 0 to 4.1	Year Around
Middle Fork Willamette:	
Double Creek, RM 0 to 2.9	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
Salt Creek, RM 0 to 29.1	Year Around
Shady Creek, RM 0 to 1.7	Year Around

Mainstem Willamette Listings
Dioxin, Aldrin, DDE, DDT, Dieldrin, PCBs, and Iron

ED_454-000322884 EPA-6822_012459

Appendix D: Water Quality Parameters List and Affected Beneficial Uses

The following is a list of parameters used by the DEQ in establishing the 303(d) List and the beneficial uses of water impacted by these parameters. This is an abbreviated summary and does not contain detailed descriptions of the standards. Specific information about these standards can be found in the Oregon 303(d) List or in OAR 340-041-0445. Listed parameters in the Management Area are indicated in boxes.

Parameters

Aquatic Weeds or Algae
Standard – The development of fungi or other growths having a deleterious effect on stream bottoms, fish, or other aquatic life, or which are injurious to health, recreation, or industry shall not be allowed.
Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Livestock Watering, Public and Private Domestic Water Supply, Irrigation, Industrial Water Supply.

Bacteria
Standard - Fecal bacteria levels shall not exceed a 30-day log mean of 126 E. Coli organisms per 100 ml, based on a minimum of 5 samples and no single sample shall exceed 406 E. Coli organisms per 100 ml. Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing, or shellfish propagation, or otherwise injurious to public health, shall not be allowed.
Beneficial Uses Affected - Water Contact Recreation, Public and Private Domestic Water Supply, Livestock Watering.

Biological Criteria
Standard – Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Chlorophyll a
Standard – The following average Chlorophyll a values shall be used to identify waterbodies where phytoplankton may impair the recognized beneficial uses:
1. Natural lakes, which thermally stratify: 0.01 mg/l.
2. Natural lakes, which do not thermally stratify, reservoirs, rivers, and estuaries: 0.015 mg/l.
Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Water Supply.

Dissolved Oxygen
Standard - For waterbodies identified as salmonid spawning, dissolved oxygen must not be less than 11.0 mg/l and inter-gravel levels must not fall below 6 mg/l. For waterbodies supporting cold water aquatic life, dissolved oxygen must not fall below 8 mg/l. For waterbodies supporting cool water aquatic life, dissolved oxygen must not fall below 6.5 mg/l. For waterbodies supporting warm water aquatic life, dissolved oxygen must not be less than 5.5 mg/l.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

ED_454-000322884 EPA-6822_012460

Flow Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Habitat Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Nutrients
Standard - see standards for aesthetics, pH, dissolved oxygen, chlorophyll a, and aquatic weeds or algae.
Beneficial Uses Affected - Aesthetics or use identified under related parameters.

pH
Standard - pH shall not fall outside 6.5 to 8.5. The following exception applies: waters impounded by dams existing on January 1, 1996, which have pHs that exceed the criteria shall not be considered in violation of the standard if the Department of Environmental Quality determines that the exceedance would not occur without the impoundment and that all practicable measures have been taken to bring the pH in the impounded waters into compliance with the criteria.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Water Contact Recreation, Salmonid Spawning, Rearing, and Migration.

Sedimentation
Standard – The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Temperature
Standard - 64F for waterbodies with salmonid fish rearing and migration, 55F for waterbodies with salmonid fish spawning, 61F for core cold water habitat, and 50F for waterbodies with bull trout. Following a temperature TMDL, temperature water quality limited waters can not be warmed more than .3 degrees Celsius (.5 degrees F) by sources from anthropogenic heating.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Fish Spawning, Rearing, and Migration.

Total Dissolved Gas
Standard – The concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection shall not exceed 110 percent of saturation, and the liberation of dissolved gases, such as carbon dioxide, hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation or other reasonable uses made of such waters shall not be allowed.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Toxics
Standard - Toxic substances shall not be introduced above natural background levels in the waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bio-accumulate in aquatic life or

ED_454-000322884 EPA-6822_012461

wildlife to levels that adversely impact public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses. Standards for specific toxic substances may be viewed on the DEQ website at http://waterquality.deq.state.or.us/wq/wqrules/340Div41Tbl20.pdf.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Public, Private and Industrial Water Supply, Livestock Watering, Fishing, Irrigation, Water Contact Recreation.

Turbidity
Standard – No more than ten percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activities.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Aesthetics.

ED_454-000322884 EPA-6822_012462

ED_454-000322884 EPA-6822_012463

Appendix E: Pesticide Use in Oregon

Oregon has strict laws and regulations related to pesticide use, storage, and reporting. All pesticide users are required to apply and store pesticides according to the label. Users of restricted-use pesticides are required to obtain certification from the ODA. Improper application and storage of pesticides may lead to surface or groundwater quality problems.

The following are prohibited under ORS 634.372:

634.372 Prohibited acts. No person shall:
(1) Make false or misleading claims through any media, relating to the effect of pesticides or application methods to be utilized.
(2) As a pesticide applicator or operator, intentionally or willfully apply or use a worthless pesticide or any pesticide inconsistent with its labeling, or as a pesticide consultant or dealer, recommend or distribute such pesticides.
(3) Operate a faulty or unsafe pesticide spray apparatus, aircraft or other application device or equipment.
(4) Perform pesticide application activities in a faulty, careless or negligent manner.
(5) Refuse or neglect to prepare and maintain records required to be kept by the provisions of this chapter.
(6) Make false, misleading or fraudulent records, reports or application forms required by the provisions of this chapter.
(7) Operate pesticide applicators' apparatus, machinery or equipment without a licensed pesticide applicator or certified private applicator performing the actual application, or supervising such application if such is performed by a pesticide trainee. This prohibition does not apply to the operation of tractors, trucks or other vehicular equipment used only under the supervision of a certified private applicator.
(8) As a pesticide applicator, work or engage in the application of any classes of pesticides without first obtaining and maintaining a pesticide applicator's license, or apply pesticides, which are not specifically authorized by such license.
(9) As a pesticide operator, engage in the business of, or represent or advertise as being in the business of, applying pesticides upon the land or property of another, without first obtaining and maintaining a pesticide operator's license, nor shall such person engage in a class of pesticide application business which is not specifically authorized by license issued by the State Department of Agriculture. Further, no such person shall employ or use any person to apply or spray pesticides who is not a licensed pesticide applicator or pesticide trainee.
(10) As a pesticide trainee, work or engage in the application of any class of pesticides without first obtaining and maintaining a pesticide trainee's certificate and is otherwise in compliance with the provisions of this chapter.
(11) Act as, or purport to be, a pesticide dealer or advertise as such without first obtaining and maintaining a pesticide dealer's license.
(12) Act as, or purport to be, a pesticide consultant without first obtaining and maintaining a pesticide consultant's license.
(13) Apply any pesticide classified as a restricted-use or highly toxic pesticide to agricultural, horticultural or forest crops on land owned or leased by the person without first obtaining and maintaining a private applicator certificate.
(14) As a person described in ORS 634.106 (6), use power-driven pesticide application equipment or devices (use hand or backpack types only), or use or apply any pesticide other than those prescribed by the ODA.
(15) Deliver, distribute, sell or offer for sale any pesticide which is misbranded.
(16) Formulate, deliver, distribute, sell or offer for sale any pesticide, which is adulterated.
(17) Formulate, deliver, distribute, sell or offer for sale any pesticide, which has not been registered as required by ORS 634.016.

ED_454-000322884 EPA-6822_012464

(18) Formulate, deliver, distribute, sell or offer for sale any powdered pesticide containing arsenic or any highly toxic fluoride which is not distinctly colored.
(19) Distribute, sell or offer for sale any pesticide except in the manufacturer's original unbroken package.
(20) Make application of pesticides, by aircraft or otherwise, within a protected or restricted area without first obtaining a permit for such application from the committee of the protected or restricted area in which the application is to be made, nor shall such person make such application contrary to the conditions or terms of the permit so issued.
(21) Use isopropyl ester of 2,4-D, or any other ester of equal or higher volatility with regard to plant damage as determined by the ODA, without first obtaining a permit for such use as provided in ORS 634.322 (10).
(22) Sell, use or remove any pesticide or device subjected to a "stop sale, use or removal" order until the pesticide or device has been released therefrom as provided in ORS 634.322 (3).
(23) Fail to comply with any provision or requirement of sections 2 to 9, chapter 1059, Oregon Laws 1999, or rules adopted thereunder. [1973 c.341 s.34; 1987 c.158 s.121; 1995 c.360 s.2; 1999 c.1059 s.14]

For complete laws and regulations related to pesticides, please consult the ODA website at http://www.oda.state.or.us/pesticide/info.html or an updated copy of the ORSs and Oregon Administrative Rules.

For more detailed recommendations on pesticide use and control of pests and disease, contact the ODA Pesticides Division, Oregon State University Extension Service, or a qualified consultant.

ED_454-000322884 EPA-6822_012465

Appendix F: Conservation Funding Programs

The following is a list of some conservation funding programs available to landowners and organizations in Oregon. For more information, please refer to the contact agencies for each program. Additional programs may become available after the publication of this document. For more current information, please contact one of the organizations listed below.

Program	General Description	Contact
Conservation Easements	Deed restrictions that protect specific aspects of land for water quality and/or habitat benefits. Easements are perpetual, flexible documents that are held by private conservation organizations, who are charged with ensuring that what is protected stays protected. Management responsibilities of land are shared with landowner. Donated easements can provide tax benefits. Easements can also be sold.	American Farmland Trust, McKenzie River Trust, Trust for Public Land
Conservation Reserve Enhancement Program (CREP)	Provides annual rent to landowners who enroll agricultural lands along streams. Also cost-shares conservation practices such as riparian tree planting, livestock watering facilities, and riparian fencing.	NRCS, SWCDs, Oregon Department of Forestry
Conservation Reserve Program (CRP)	Competitive CRP provides annual rent to landowners who enroll highly erodible lands. Continuous CRP provides annual rent to landowners who enroll agricultural lands along seasonal or perennial streams. Also cost-shares conservation practices such as riparian plantings.	NRCS, SWCDs
Conservation Stewardship Program (CSP)	Provides cost-share and incentive payments to landowners who have attained a certain level of stewardship and are willing to implement additional conservation practices.	NR CS, SWCDs
Emergency Watershed Protection Program (EWP)	Available through the USDA-NRCS. Provides federal funds for emergency protection measures to safeguard lives and property from floods and the products of erosion created by natural disasters that cause a sudden impairment to a watershed.	NRCS, SWCDs

ED_454-000322884 EPA-6822_012466

Program	General Description	Contact
Environmental Protection Agency Section 319 Grants	Fund projects that improve watershed functions and protect the quality of surface and groundwater, including restoration and education projects.	DEQ, SWCDs, Watershed Councils
Environmental Quality Incentives Program (EQIP).	Cost-shares water quality and wildlife habitat improvement activities, including conservation tillage, nutrient and manure management, fish habitat improvements, and riparian plantings.	NRCS, SWCDs
Farm and Ranchland Protection Program (FRPP)	Cost-shares purchases of agricultural conservation easements to protect agricultural land from development.	NRCS, SWCDs
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	IRS
Fee Title Acquisition	In some situations, private land conservancies can acquire land for a fee from landowners. Generally, land conservancies purchase property in relatively good ecological health, and buy the property at appraised value.	McKenzie River Trust, The Nature Conservancy, SWCDs
Forestry Incentives Program (FIP)	Provides cost sharing for several forest stand improvement practices.	NRCS, SWCDs, Oregon Department of Forestry
Forest Resource Trust	State assistance up to 100 percent of the costs to convert non-stocked forestland to timber stands. Available to non-industrial private landowners.	Oregon Department of Forestry
Grassland Reserve Program (GRP)	Provides incentives to landowners to protect and restore pastureland, rangeland, and certain other grasslands.	NRCS, FSA, SWCD
Landowner Incentive Program (LIP)	Provides funds to enhance existing incentive programs for fish and wildlife habitat improvements.	U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife
Oregon Watershed Enhancement Board (OWEB).	Provides grants for a variety of restoration, assessment, monitoring, and education projects. 25 percent match requirement on all grants.	SWCDs, Watershed Councils, OWEB
Oregon Watershed Enhancement Board Small Grants Program	Provides grants up to $10,000 for watershed restoration projects. 25 percent match requirement.	SWCDs, Watershed Councils, OWE B
Partners for Wildlife Program.	Provides financial and technical assistance to private and non-federal landowners to restore and improve wetlands, riparian areas, and upland	U.S. Fish and Wildlife Service, NRCS, SWCDs

ED_454-000322884 EPA-6822_012467

Program	General Description	Contact
	habitats in partnership with the U.S. Fish and Wildlife Service and other cooperating groups.	
Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and management projects. Projects should reduce erosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	NRCS, SWCDs.
Resource Conservation & Development (RC & D) Grants	Provides assistance to organizations within RC & D areas in accessing and managing grants.	Resource Conservation and Development
State Forestation Tax Credit	Provides for reforestation of under-productive forestland not covered under the Oregon Forest Practices Act. Situations include brush and pasture conversions, fire damage areas, and insect and disease areas.	Oregon Department of Forestry
State Tax Credit for Fish Habitat Improvements	Provides tax credit for part of the costs of voluntary fish habitat improvements and required fish screening devices.	Oregon Department of Fish and Wildlife
Stewardship Incentive Program (SIP).	Cost-sharing program for landowners to protect and enhance forest resources. Eligible practices include tree planting, site preparation, pre-commercial thinning, and wildlife habitat improvements.	NRCS, SWCDs, Oregon Department of Forestry
Wetlands Reserve Program (WRP)	Provides cost sharing to landowners who restore wetlands on agricultural lands.	NRCS, SWCDs
Wildlife Habitat Incentives Program	Provides cost-share for wildlife habitat enhancement activities.	NRCS, SWCDs
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop a wildlife management plan with the approval of the Oregon Department of Fish and Wildlife.	Oregon Department of Fish and Wildlife, SWCDs, NRCS.

ED_454-000322884 EPA-6822_012468

ED_454-000322884 EPA-6822_012469

Appendix G: Revised Universal Soil Loss Equation (RUSLE)

The RUSLE is a model that estimates the average annual level of soil loss on a field due to sheet and rill erosion. The sheet erosion process occurs when rainfall and runoff water combine to erode a relatively uniform layer of soil. Runoff may also erode soil to form numerous small channels a few inches deep, or rills.

The equation for estimating annual soil loss is:

A = RKLSCP

where:

A = average annual soil loss in tons per acre;

R = rainfall and runoff intensity index by geographic location;

K = soil erodibility factor;

LS = topographic factor, L is for slope length and S is for slope percent;

C = cropping factor, the ratio of soil loss for the given conditions to that from a clean-cultivated field;

P = conservation practice factor, or the ratio of soil loss for a given practice to that for purely up-and-down-the-slope farming.

Each soil type has a soil loss tolerance factor, or T. If the annual soil loss exceeds the soil loss tolerance factor, the soil is eroding at an unsustainable rate; in other words, the soil quality is degrading. Natural Resource Conservation Service and SWCD offices have soil surveys to help landowners determine soil types, and also provide technical assistance to help landowners estimate the rate of soil loss on their property. For more information, contact the local NRCS and SWCD office.

ED_454-000322884 EPA-6822_012470

ED_454-000322884 EPA-6822_012471

Appendix H: ORS 468B.025 and 468B.050

ORS 468B.025 is an existing statute that was developed to address water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Plans and Rules in the state.

ORS 468B.025(1) states:

...no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

ORS 468B.050 identifies the conditions when a permit is required. In agriculture, under state rules, these are referred to as Confined Animal Feeding Operations and are operations that confine animals on prepared surfaces to support animals in wet weather, have wastewater treatment works, discharge any wastes into waters of the state, or meet the federal definition of a Concentrated Animal Feeding Operation (40 CFR § 122.23).

Definitions:

"Pollution" has the meaning given in ORS 468B.005(3) which states: "such alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof."

"Wastes" has the meaning given in ORS 468B.005(7) which states: sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances which will or may cause pollution or tend to cause pollution of any waters of the state.

Other substances that will or may cause pollution include commercial fertilizers, soil amendments, composts, animal wastes, and vegetative materials.

ED_454-000322884 EPA-6822_012472

Appendix I: References on Water Quality Improvement Practices for Agricultural Landowners

Below is a list of selected references with more specific information on water quality and natural resources improvement practices. Copies of many of these publications are available from the local Oregon State University Extension office or local SWCD. Underlined publications are also available online on the publishing agency's website.

General Water Quality Protection

Adams, E.B. 1992. Farming practices for groundwater protection. Washington State University, Spokane, Washington.

Hermanson, R.E. 1994. Care and feeding of septic tanks. Washington State University, Spokane, Washington.

Hirschi, M. et al. 1994. 50 ways farmers can protect their groundwater. University of Illinois, Urbana, Illinois.

Hirschi, M., et al. 1997. 60 ways farmers can protect surface water. University of Illinois, Urbana, Illinois.

Ko, L. 1999. Tips on land and water management for small acreages in Oregon. Oregon Association of Conservation Districts, Portland, Oregon.

U.S. Department of Agriculture NRCS. 1998. National Handbook of Conservation Practices. U.S. Department of Agriculture NRCS, Portland, Oregon.

Riparian Areas and Streams

Adams, E.B. 1994. Riparian Grazing. Washington State University, Spokane, Washington.

Darris, D. and S.M. Lambert. 1993. Native willow varieties for the Pacific Northwest. U.S. Department of Agriculture Soil Conservation Service, Corvallis Plant Materials Center, Corvallis, Oregon.

Nash, E. and T. Mikalsen, eds. 1994. Guidelines for streambank restoration. Georgia Soil and Water Commission, Atlanta, Georgia.

South Santiam Watershed Council. 1998. Guide for using Willamette Valley native plants along your stream. Linn SWCD, Tangent, Oregon.

Nutrient and Manure Management

Godwin, D. and J.A. Moore. 1997. Manure management in small farm livestock operations: protecting surface and groundwater. Oregon State University, Corvallis, Oregon.

Hart, J. 1995. How to take a soil sample...and why. Oregon State University, Corvallis, Oregon.

Hart, J. 1999. Analytical laboratories serving Oregon. Oregon State University, Corvallis, Oregon.

Marx, E.S., J. Hart, and R.G. Stevens. 1999. Soil Test Interpretation Guide. Oregon State University, Corvallis, Oregon.

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Moore, J. and T. Willrich. 1993. Manure management practices to reduce water pollution. Oregon State University, Corvallis, Oregon.

Sattell, R. et al. 1999. Nitrogen scavenging: using cover crops to reduce nitrate leaching in western Oregon. Oregon State University, Corvallis, Oregon.

Grazing and Pasture Management

Ursander, D. et al. 1997. Pastures for Profit: a guide to rotational grazing. University of Wisconsin, Madison, Wisconsin.

Erosion and Sediment Control

Hansen, H. and W. Trimmer. 1997. Irrigation runoff control strategies. Oregon State University, Corvallis, Oregon.

Trimmer, W. and H. Hansen. 1994. Irrigation scheduling. Oregon State University, Corvallis, Oregon.

Pesticide Management and Integrated Pest Management

Publishers:

Acres USA	Rodale Press
P.O. Box 91299	33 East Minor St.
Austin, TX 78709	Emmaus, PA 18098
(512) 892-4400	(610) 967-5171
info@acresusa.com	info@rodale.com

Kerle, E.A., J.J. Jenkins, and P.A. Vogue. 1996. Understanding pesticide persistence and mobility for groundwater and surface water protection. Oregon State University, Corvallis, Oregon.

Menzies, G., C.B. MacConnell, and D. Havens. 1994. Integrated pest management: effective options for farmers.

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Appendix J: Where Does the 25-year Storm Event Requirement come from in the Riparian Characteristic to Achieve?

The 25-year, 24-hour storm is used because the ability to dissipate stream energy and maintain streambank integrity after this level of storm intensity is one of the criteria for a riparian area to be in Proper Functioning Condition.

The Proper Functioning Condition assessment process is a way to determine how well the physical processes are functioning in a riparian or wetland area. Once a riparian-wetland area reaches Proper Functioning Condition, it is in a state of resiliency that will allow the system to hold together during a 25 to 30 year flow event. In other words, the riparian area can resist major structural changes brought about by the storm event, and can recover in time for future events. Riparian areas that have not yet achieved PFC are classified as either functioning at-risk, nonfunctional, or unknown. A functioning at-risk area would likely experience major structural changes, such as excessive bank erosion and loss of riparian vegetation, in a 25 year, 24-hour flood event.

To be in compliance with the proposed riparian Area Rule OAR 603-095-2140 (1) (b) a landowner would need to cease activities that prevent the growth and establishment of vegetation that would help move a riparian area toward providing functions necessary for a stream to withstand the flows resulting from a 25-year storm. For example, if a landowner plowed a riparian area and destroyed the riparian vegetation, he or she would clearly be out of compliance with the rule. If a landowner stopped tilling and allowed vegetation to come in, they would be in compliance with the rule even if the riparian area were not yet able to withstand a 25-year, 24-hour storm event. If a landowner allowed grazing in a riparian area but allowed the area to move toward providing this level of riparian function, he or she would be in compliance with the rule.

For the Southern Willamette Valley, 25-year, 24-hour storm events range from 4.0 to 6.5 inches of rain.

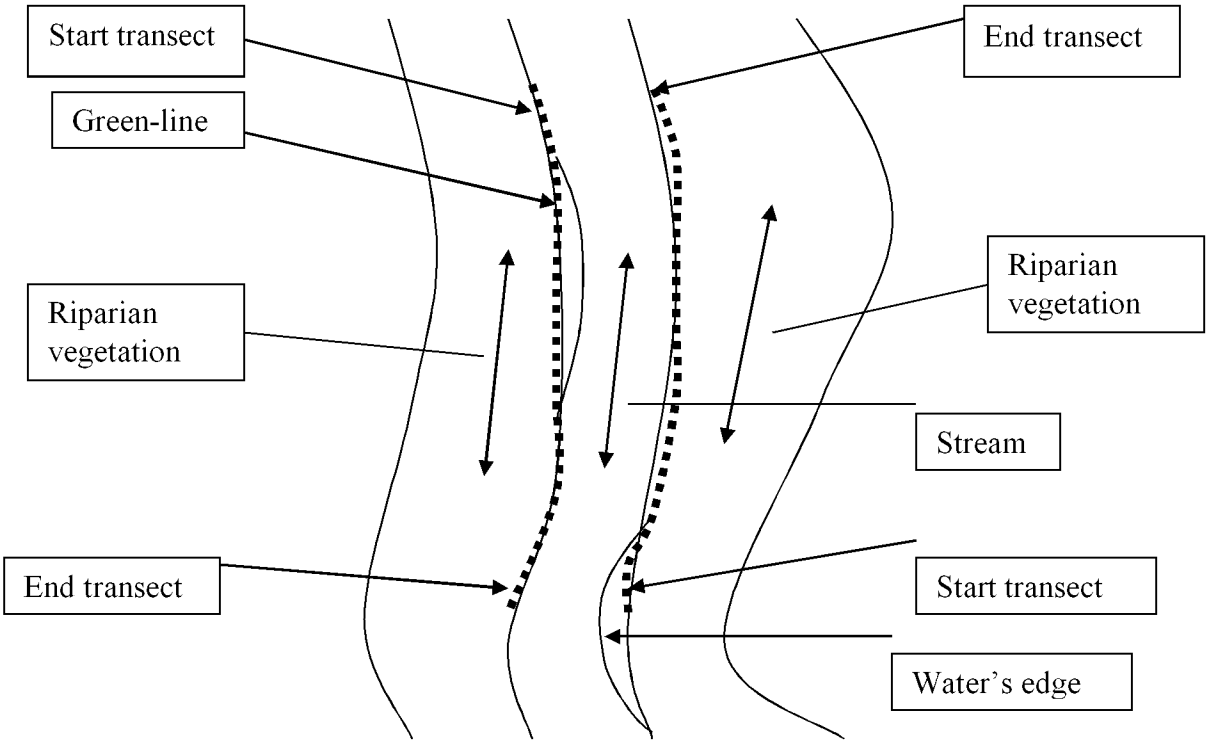
How would compliance with the riparian Characteristic to Achieve be determined?

An inspector would first consider site capability when evaluating a riparian area for compliance with the rule. In other words, the inspector would first determine the kinds and amounts of vegetation the site could produce given legacy conditions (conditions caused by past management or events), such as riprap, and natural limiting conditions, such as soil type. The inspector would also determine if the site were capable of producing vegetation stable enough to withstand flows following a 25-year, 24-hour storm event. If the site is capable of providing this function, the inspector would then determine if the site is either moving toward providing the function or if there is already enough vegetation to adequately protect the streambank. In both situations, the site would likely be in compliance.

If the inspector determined the site was probably out of compliance using the previous criteria, he or she would conduct a green line transect along the stream (Figure 1) and document the ground cover along the transect. The main criteria for noncompliance would be a prevalence of bare ground throughout the riparian area, limited vegetation indicating little to no root mass below-ground, and evidence of bank slumping or sediment runoff into the stream. Also, the problem would clearly have to be caused by agricultural activities.

ED_454-000322884 EPA-6822_012475

Figure 1. A green-line transect samples the first line of green vegetation from the water's edge. The green-line is the line nearest to the stream where perennial vegetation is first encountered.



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Appendix K: Gettings Creek Priority Area Action Plan

Gettings Creek Priority Area: Action Plan
For the Southern Willamette Ag Water Quality management Area
Upper Willamette SWCD
2013 – 2015

A. Description of Watershed:

Gettings creek is a small perennial stream that is a tributary to the Coast Fork Willamette River. The Gettings Creek watershed is located on the east side of I-5 at exit 173 north of Cottage Grove OR. The watershed is approximately 10,000 acres in size with land uses consisting of 60% forest, 20% rural residential, and 20% agriculture. Agriculture in the watershed is mainly Cattle/Hay production and small acreage livestock producers.

B. Basis for Selection of Focus Area:

In 2011, the Upper Willamette SWCD worked with the ODA regional planner to develop a list of potential 6th field priority area sites. A meeting was held with watershed council representatives from the McKenzie, Middle Fork, and Coast Fork watershed councils to determine potential sites. Criteria for selection consisted of size of area, land use characteristics, water quality monitoring data, demographics of the area, parameters of concern, and aerial photos review. At this meeting 3 sites were selected to move forward to on the ground assessment of each site. From site assessment information, Gettings Creek was chosen as the priority area for the Southern Willamette Ag water quality management plan area.

C. Water Quality Parameters of Concern:

Gettings Creek is listed on the 303(d) list for Temperature and E.coli. In 2009 and 2010 the Coast Fork Watershed council conducted water quality monitoring at two locations in the lower Gettings Creek tributary. The main concern was with E.coli levels at the downstream sampling site. The state standard for E. coli was exceeded in 54% of the samples taken. In windshield evaluations much of the lower reach of the stream has no exclusion of livestock to the stream, and is lacking in riparian vegetation along a majority of the stream. Evaluation for temperature will be conducted using riparian vegetation as a surrogate. The Upper Willamette SWCD shall work with landowners to increase riparian vegetation along the stream and to install exclusion fence to eliminate livestock presence in the stream.

D. Description of Assessment Method(s):

Stream Temperature will be evaluated using riparian vegetation condition as a surrogate. Arial photo interpretation and field verification will be used to evaluate riparian vegetation condition and to determine if the vegetation is adequate to provide the functions as identified in the Area Plan. The Gettings Creek Sub-watershed riparian classification will have four categories related to riparian vegetation.

- **Class I** – Forest or no perennial streams present.
- **Class II**- Agricultural activities appear to be preventing riparian vegetation from achieving site capability.
- **Class III** - Agricultural activities are not impacting or are no longer impacting riparian vegetation, but site capability is not being met.
- **Class IV**- Site capability vegetation appears to be present in agricultural areas.

ED_454-000322884 EPA-6822_012477

Evaluation for E. coli will be conducted using presence of livestock an proximity to either seasonal or perennial streams as an initial surrogate. Bacteria classification will have four categories related to potential for bacteria to enter the waters of the state.

- **Class I** – Forest or non-agricultural lands.
- **Class II**- Agricultural activity are likely causing discharge of bacteria into waters of the state.
- **Class III** – Agricultural activities are not present on the property.
- **Class IV** – Agricultural properties have no potential for run-off of E. coli.

II. Objectives:
A). Increase percent site capable vegetation in riparian areas adjacent to Agricultural land by 20%.
B). Decrease number of landowners feeding livestock within the active floodplain by 25%

III. Implementation activities and timeline:
The following is a summary of implementation activities conducted during the last biennium in the Gettings Creek Priority Area. Work by the District is continuing by implementing three projects with landowners during the 2013-2015 biennium.

Quarter #	Quarter ending	Activity	Results	Notes
1	Sept 2011	Develop map of priority area including ownership, land use, riparian condition analysis.	Used map to prioritize landowner recruitment. Completes Q. 1	
	Sept. 2011	Validate map with local staff and road surveys.	Completes Q. 1	
	Sept 2011	Develop contact list of all landowners and rural residents in priority area.	Completes Q. 2	
2	Dec 2011	Contact all agricultural and rural residential landowners with information on the AgWQ plan and	Sent out 3 mailings to all landowners within priority area. (90 mailings each)	

ED_454-000322884 EPA-6822_012478

		rules.		
	Dec 2011	Targeted workshop for landowners regarding practices used in addressing the concerns	Conducted landowner workshop in Cottage Grove. 6 landowners attended.	
	Dec 2011	Inventory and site assessment with 3 landowners.	Conducted two assessments with landowners on a voluntary basis.	
3	March 2012	Target workshop on management of riparian areas	Due to poor turnout for previous workshop. Second workshop shall be held at landowner property at later date.	
4	June 2012	Inventory and site assessment with 10 landowners.	Conducted site assessments for four landowners.	These are landowners who voluntarily contacted the SWCD
5	Sept 2012	Contact remaining priority landowners and offer tech. assistance.	Sent additional mailing to all landowners.	
6	Dec 2012	Seek funds (OWEB etc) for landowners to implement AgWQ project	Submitted small grant project, approved for implementation. Submitted large OWEB grant for riparian work.	Submitted a large Grant application to OWEB to riparian enhancement work on main Gettings Creek, grant was not funded.
7	March 2013	Worked with 3 landowners to implement projects		
8	June 2013	Implement projects with five landowners	Working with 3 landowners in priority area. Provide quantitative results to ODA	Submitted small grant application that was approved for riparian and upland activites.

This project is not completed, projects have been approved for funding and implementation shall be conducted during the 2013 – 2015 biennium upon available funding for projects

Quarter #	Quarter ending	Activities	Results	Notes

ED_454-000322884 EPA-6822_012479

1	Sept 2013	Implement landowner projects, continue recruitment of landowners	Complete 3 on-going landowner projects.	Due to lack of available funding the large OWEB grant application submitted by the District for the Harrold property was rejected. District staff has completed one (1) water quality project during this quarter addressing inputs from livestock at the headwaters of Gettings Creek. Staff has started development of a second project addressing livestock concerns adjacent to Gettings Creek and is working with a third landowner to develop a project that will improve riparian vegetation, exclude livestock from the near stream area, and utilize rainwater harvesting for off-stream watering for livestock.
2	Dec 2013	Same as above	continue work with recruited landowners to implement projects. To date District staff has developed 3 site plans with landowners within the priority area. Two will/have received funding , one has not.	**Completed small grant project located at headwaters of North Gettings Creek. Practices include: Composting facility for livestock waste, heavy use protection, riparian enhancement of**

ED_454-000322884 EPA-6822_012480

				150 feet of stream, and exclusion fence along the riparian. Total number of effected acres addressed by project 2 Developed small grant project with another landowner adjacent to North Gettings Creek. Practices include composting facility, heavy use protection, roof runoff. This project is under review for approval and will begin when funding is in place. Total number of acres effected 3.
3	March 2014	Assist landowners in implementing projects	Due to funding issues one project has been delayed and the other listed above is waiting for dry weather to start excavation for practices.	**Developed and received approval for small grant for livestock operation on North gettings creek. Planned practices include manure composting facility, heavy use protection, roof-run-off, riparian enhancement of 200 ft. of stream and exclusion fence. During this work met with second landowner adjacent to project location. Started development of**

ED_454-000322884 EPA-6822_012481

				plan with second landowner. Practices include riparian enhancement, 400 ft. of stream, manure management, heavy use protection. Funding for this project is being sought.
4	June 2014	Conduct workshop at participating landowners property for all landowners in priority area	Recruit 7 landowners to participate in project work.	**Received funding approval for second project application $ 10,000.00. Begin development of third small project. Made visit to large landowner project implemented by landowner on his own. Practices included use exclusion and planned enhancement for winter of riparian. Scheduled tour of work being conducted in priority area. Met with large landowner to discuss resubmitting grant proposal for riparian enhancement along bottom of Gettings Creek watershed. Have started initial development of proposal.**
5, 6, 7, 8	June 2015	Complete		**Conducted**

ED_454-000322884 EPA-6822_012482

		additional project work with landowners. Provide results to ODA.		**landowner site visit on north Gettings creek landowner interested in conducting riparian project. Began implementation of practices for landowner project which include manure mgt, heavy use protection, grassed waterway. Conducted tour of two project sites in the priority Area. 12 attendees toured two farms and viewed practices of manure mgt, rotational grazing, irrigation water mgmt., heavy use protection and riparian enhancement.**

IV. Pre and Post-implementation Assessments:

	Percent of stream miles within focus area			
	2013	**2015**		
Class I	**0**	**0**		
Class II	**44,723**	**39623**		
Class III	**N/A**	**N/A**		
Class IV	**8,131**	**8,131**		

For the biennium 2011 – 2013 we, since implementation has not yet started we are providing potential changes to occur during this biennium.

- Percent of streams in class I increased by 0% because this area is under the Forest Practices Act.
- Percent of streams in class II decreased by 5 %

B. Implementation Summary:

ED_454-000322884 EPA-6822_012483

Number of landowners contacted by mail: 0 no mailings were distributed during this quarter.
Number of landowners contacted by phone: 3
Number of landowners with proposed projects: 1
Stream miles with exclusion fence: .4 miles
Stream miles of riparian restoration: .3 miles
Number of Grants received: 1
Estimated cost of grants: $10,000

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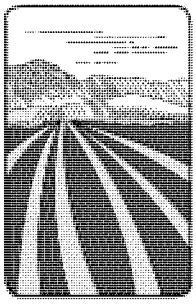

Oregon
Department
of Agriculture

Southern Willamette Valley Agricultural Water Quality Management Area Plan

Developed by the:

Southern Willamette Valley Local Advisory Committee

Oregon Department of Agriculture

With support from the:

Upper Willamette Soil and Water Conservation District
(Note: only ODA & LAC have statute authority to write the plan)

Date:

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Table of Contents

ED_454-000322884 EPA-6822_012487

ED_454-000322884 EPA-6822_012488

ED_454-000322884 EPA-6822_012489

Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendment
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
Regulations – Agricultural Water Quality Management Area Regulations
RUSLE – Revised Universal Soil Loss Equation
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
WQPMT – Water Quality Pesticides Management Team

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Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Agricultural Water Quality Management Area (Management Area). The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, compliance, and monitoring.

The provisions of this Area Plan do not establish legal requirements or prohibitions, as described in Oregon Revised Statute (ORS) 568.912(1).

Required Elements of Area Plans

Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality, as required by state and federal law (Oregon Administrative Rule (OAR) 603-090-0030(1)). At a minimum, an Area Plan must:

- Describe the geographical area and physical setting of the Management Area.
- List water quality issues of concern.
- List impaired beneficial uses.
- State that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Include water quality objectives.
- Describe pollution prevention and control measures deemed necessary by the Oregon Department of Agriculture (ODA) to achieve the goal.
- Include an implementation schedule for measures needed to meet applicable dates established by law.
- Include guidelines for public participation.
- Describe a strategy for ensuring that the necessary measures are implemented.

Plan Content

Chapter 1: Agricultural Water Quality Management Program Purpose and Background. The purpose is to have consistent and accurate information about the Agricultural Water Quality Management Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, regulations (Area Rules), and available or beneficial practices to address water quality issues.

Chapter 3: Local Goals, Objectives, and Implementation Strategies. Chapter 3 presents goal(s), measurable objectives and timelines, and strategies to achieve the goal(s) and objectives.

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. ODA and the Local Advisory Committee (LAC) will work with partners to summarize land condition and water quality status. Trends are summarized to assess progress toward the goals and objectives in Chapter 3.

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ED_454-000322884 EPA-6822_012492

Chapter 1: Agricultural Water Quality Management Program Purpose and Background

1.1 Purpose of Agricultural Water Quality Management Program and Applicability of Area Plans

As part of Oregon's Agricultural Water Quality Management Program (Ag Water Quality Program), this Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing local agricultural water quality issues. The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) on agricultural and rural lands for the area within the boundaries of the Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). This Area Plan has been developed and revised by ODA, the LAC, with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). Throughout the development and revision processes, the public was invited to participate. This included public comment at meetings and public hearings during the Area Plan approval process. This Area Plan is implemented using a combination of outreach and education, conservation and management activities, compliance, monitoring, evaluation, and adaptive management.

The provisions of this Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)). Each Area Plan is accompanied by OAR regulations that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OARs 603-090-0000 to 603-090-0120) and under the regulations for this Management Area (OARs 603-095-2100). The Ag Water Quality Program's general OARs guide the Ag Water Quality Program, and the OARs for the Management Area are the regulations that landowners must follow.

This Area Plan and its associated regulations apply to all agricultural activities on non-federal and non-Tribal Trust land within the Management Area, including:

- Large commercial farms and ranches.
- Small rural properties grazing a few animals or raising crops.
- Agricultural lands that lay idle or on which management has been deferred.
- Agricultural activities in urban areas.
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).

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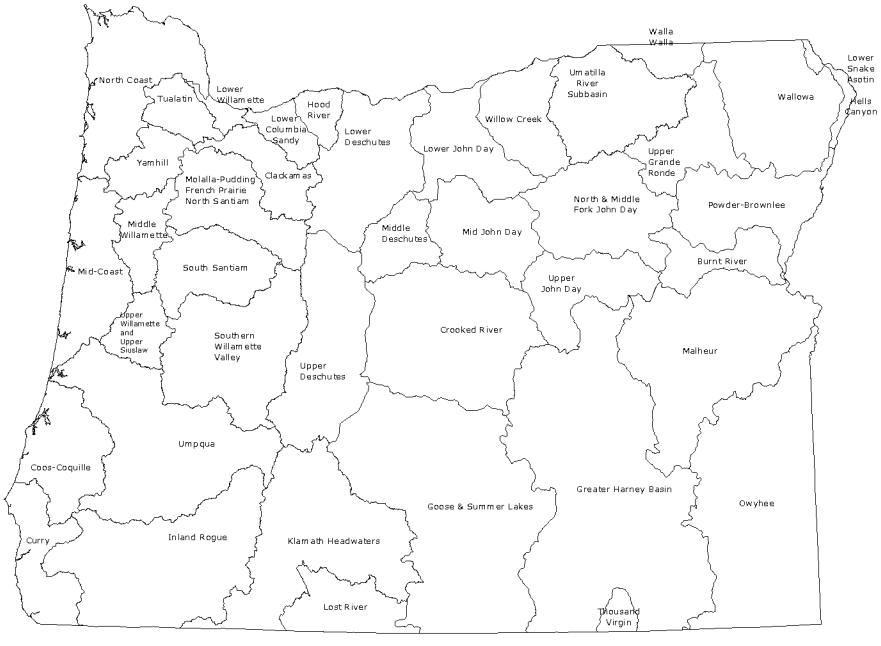
1.2 History of the Ag Water Quality Program

In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act, directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion, and to achieve water quality standards (ORS 568.900 through ORS 568.933). Senate Bill 502 was passed in 1995 to clarify that ODA regulates agriculture with respect to water quality (ORS 561.191). This Area Plan and its associated regulations were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and associated regulations in 38 watershed-based Management Areas across Oregon (Figure 1). Since 2004, ODA, LACs, SWCDs, and other partners have focused on implementation, including:

- Providing education, outreach, and technical assistance to landowners.
- Implementing projects to improve agricultural water quality.
- Investigating complaints of potential violations of regulations.
- Conducting biennial reviews of Area Plans and regulations.
- Monitoring, evaluation, and adaptive management.
- Developing partnerships with SWCDs, state, federal, and tribal agencies, watershed councils, and others.

Figure 1: Map of 38 Agricultural Water Quality Management Areas



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1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture (ODA)

ODA is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program is intended to meet the needs and requirements related to agricultural water pollution, including:

- State water quality standards.
- Load allocations for agricultural nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the Clean Water Act (CWA), Section 303(d).
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if a GWMA has been established and an Action Plan developed).

ODA has the legal authority to develop and implement Area Plans and associated regulations for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). ODA will base Area Plans and regulations on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and associated regulations. ODA has responsibility for any actions related to enforcement or determination of noncompliance with regulations (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give authority to ODA to adopt regulations that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The emphasis of this Area Plan is on voluntary action by landowners or operators to control the factors effecting water quality in the Management Area. The regulations are outlined as a set of minimum standards that must be met on all agricultural or rural lands. Landowners and operators who fail to address these regulations may be subject to enforcement procedures, which are outlined below.

Enforcement Action—ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with water quality regulations. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed. If a violation is documented, ODA may issue a pre-enforcement notification or an Order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, the landowner or operator will be directed by ODA to remedy the condition through required corrective actions under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the required corrective actions, civil penalties may be assessed for continued violation of the regulations. See the Compliance Flow Chart for a diagram of the compliance process. If and when other governmental policies, programs, or regulations conflict with this Area Plan or associated regulations, ODA will consult with the agency(ies) and attempt to resolve the conflict in a reasonable manner.

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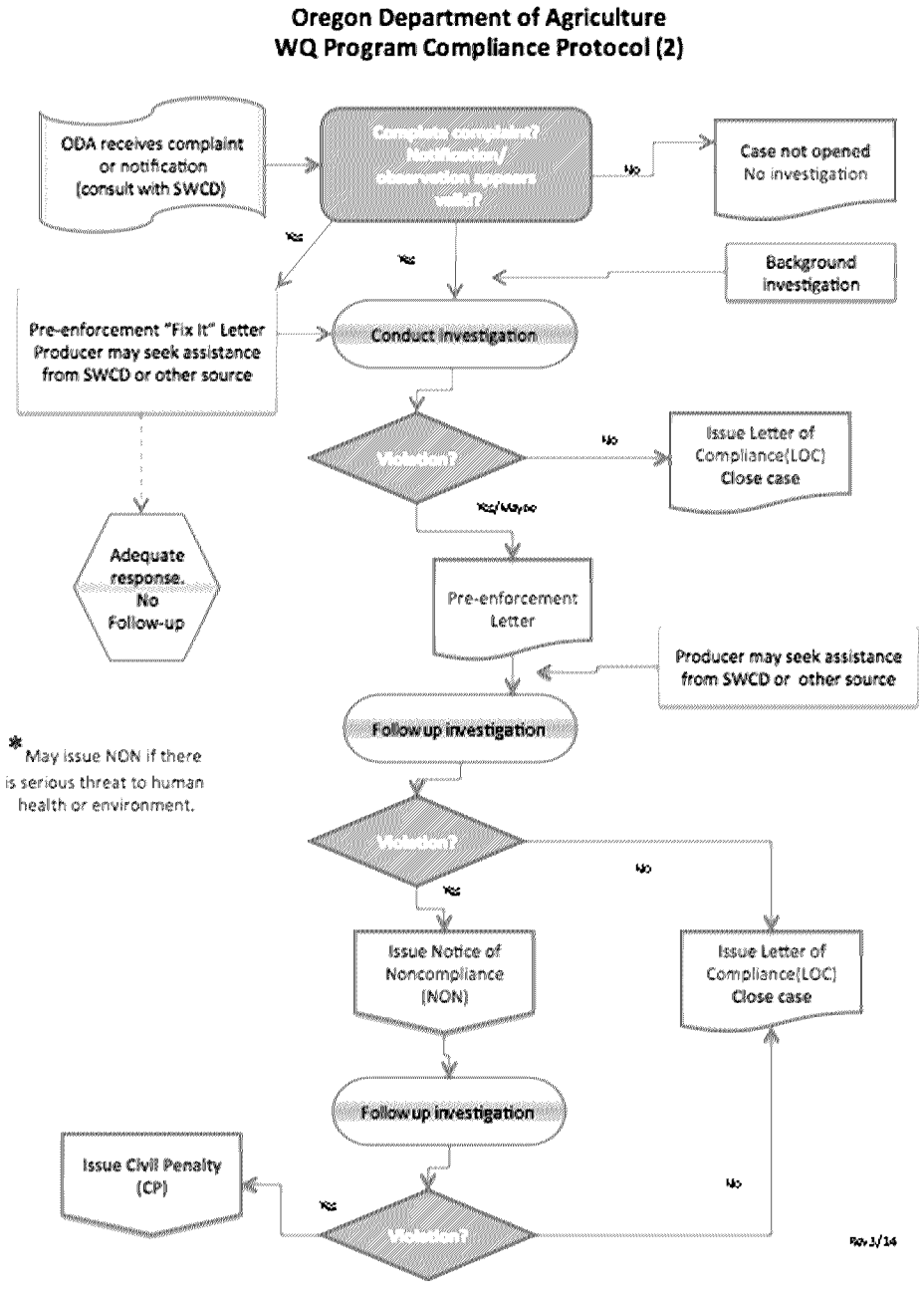
Figure 2: Compliance Flow Chart



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1.3.2 Local Management Agency

A Local Management Agency is an organization that ODA has designated to implement an Area Plan (OAR 603-090-0010). The legislative intent is for SWCDs to be Local Management Agencies to the fullest extent practical, consistent with the timely and effective implementation of Area Plans (ORS 568.906). SWCDs have a long history of effectively assisting landowners who voluntarily address natural resource concerns. Currently, all Local Management Agencies in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an intergovernmental agreement between ODA and each SWCD. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and associated regulations as needed.

1.3.3 Local Advisory Committee (LAC)

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members, to assist with the development and subsequent biennial reviews of the local Area Plan and regulations. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are composed primarily of landowners in the Management Area and must reflect a balance of affected persons.

The LAC may meet as frequently as necessary to carry out their responsibilities, which include, but are not limited to:

- Participate in the development and ongoing revisions of the Area Plan.
- Participate in the development and revisions of regulations.
- Recommend strategies necessary to achieve goals and objectives in the Area Plan.
- Participate in biennial reviews of the progress of implementation of the Area Plan and regulations.
- Submit written biennial reports to the Board of Agriculture and the ODA director.

1.3.4 Agriculture's Role

Each individual landowner or operator in the Management Area is required to comply with the regulations, which set minimum standards. However, the regulations alone are not enough. To achieve water quality standards, individual landowners also need to attain land conditions that achieve the goals and objectives of the voluntary Area Plan. Each landowner or operator is not individually responsible for achieving water quality standards, agricultural pollution limits, or the goals and objectives of the Area Plan. These are the responsibility of the agricultural community collectively.

Technical and financial assistance is available to landowners who want to work with SWCDs (or with other local partners) to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance.

Area regulations only address impacts that result from agricultural activities. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Conditions resulting from unusual weather events or other circumstances not within the reasonable control of the landowner or operator are considered when making compliance decisions. Agricultural landowners may be responsible for some of the above impacts under other legal authorities.
Under the Area Plan and associated regulations, agricultural landowners and operators are not responsible for mitigating or addressing factors that do not result from agricultural activities, such as:

ED_454-000322884 EPA-6822_012497

- Hot springs, glacial melt water, extreme or unforeseen weather events, and climate change.
- Septic systems and other sources of human waste.
- Public roadways, culverts, roadside ditches and shoulders.
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments.
- Housing and other development in agricultural areas.

1.3.5 Public Participation

The public was encouraged to participate when ODA, LACs, and SWCDs initially developed the Area Plans and associated regulations. ODA and the LAC in each Management Area, held public information meetings, a formal public comment period, and a formal public hearing. ODA and the LACs modified the Area Plans and regulations, as needed, to address comments received. The director of ODA adopted the Area Plans and regulations in consultation with the Board of Agriculture.

ODA, LACs, and SWCDs conduct biennial reviews of the Area Plans and regulations. Partners, stakeholders, and the general public are invited to participate in the process. Any future revisions to the regulations will include a public comment period and a public hearing.

1.4 Agricultural Water Quality

1.4.1 Point and Nonpoint Sources of Water Pollution

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. Significant point sources are required to obtain permits that specify their pollutant limits. Agricultural operations regulated as point sources include permitted Confined Animal Feeding Operations (CAFOs) and pesticide applications in, over and within three feet of water. Many CAFOs are regulated under ODA's CAFO Program. Irrigation water discharges may be at a defined discharge point, but does not currently require a permit.

Nonpoint water pollution originates from the general landscape and is difficult to trace to a single source. Nonpoint sources include erosion and contaminated runoff from agricultural and forest lands, urban and suburban areas, roads, and natural sources. In addition, groundwater can be impacted from nonpoint sources including agricultural amendments (fertilizers and manure).

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses of clean water include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, and commercial navigation and transportation. The most sensitive beneficial uses are usually fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses are generally the first to be impaired as a water body is polluted, because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impacted in this Management Area are summarized in Chapter 2.

Many water bodies throughout Oregon do not meet state water quality standards. These water bodies may or may not have established water quality management plans documenting needed reductions. The most common water quality concerns related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, algae, pH, dissolved oxygen, harmful algal blooms, nitrates, pesticides, and mercury. These parameters vary by Management Area and are summarized in Chapter 2.

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1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs)

Every two years, the DEQ is required by the federal Clean Water Act (CWA) to assess water quality in Oregon. CWA Section 303(d) requires DEQ to identify a list of waters that do not meet water quality standards. The resulting list is commonly referred to as the 303(d) list. DEQ, in accordance with the CWA, is required to establish TMDLs for pollutants on the 303(d) list.

A TMDL includes an assessment of water quality data and current conditions and describes a plan to restore polluted waterways to conditions that meet water quality standards. TMDLs specify the daily amount of pollution that a water body can receive and still meet water quality standards. Through the TMDL, point sources are assigned pollution limits as "waste load allocations" in permits, while nonpoint sources (agriculture, forestry, and urban) are assigned pollution limits as "load allocations." TMDLs are legal orders issued by the DEQ, so parties assigned waste or load allocations are legally required to meet them. The agricultural sector is responsible for meeting the pollution limit (load allocation) assigned to agriculture specifically, or to nonpoint sources in general, as applicable.

TMDLs generally apply to an entire basin or subbasin, and not just to an individual water body on the 303(d) list. Once a TMDL is developed for a basin, the basin's impaired water bodies are removed from the 303(d) list, but they remain on the list of impaired water bodies. When data show that water quality standards have been achieved, water bodies will be identified on the list of water bodies that are attaining water quality standards.

As part of the TMDL process, DEQ identifies the Designated Management Agency or parties responsible for submitting TMDL implementation plans. TMDLs designate that the local Area Plan is the implementation plan for the agricultural component of the TMDLs that apply to this Management Area. Biennial reviews and revisions to the Area Plan and regulations must address agricultural or nonpoint source load allocations from TMDLs.

The list of impaired water bodies (303(d) list), the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.

1.4.4 Water Pollution Control Law – ORS 468B.025 and ORS 468B.050

Senate Bill 502 was passed in 1995, authorizing ODA as the state agency responsible for regulation of farming activities for the purpose of protecting water quality. A Department of Justice opinion dated July 10, 1996, states that "...ODA has the statutory responsibility for developing and implementing water quality programs and rules that directly regulate farming practices on exclusive farm use and agricultural lands." In addition, this opinion states, "The program or rule must be designed to achieve and maintain Environmental Quality Commission's water quality standards."

To implement Senate Bill 502, ODA incorporated ORS 468B into all of the Area Plans and associated regulations in the state. A Department of Justice opinion, dated September 12, 2000, clarifies that ORS 468B.025 applies to point and nonpoint source pollution.

ED_454-000322884 EPA-6822_012499

ORS 468B.025 states that:

"(1) ...no person shall:

(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050."

The aspects of ORS 468B.050 that apply to the Ag Water Quality Program, state that:

"(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:

(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system."

Definitions (ORS 468B.005)

"Wastes" means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances, which will or may cause pollution or tend to cause pollution of any waters of the state. Additionally, OAR 603-095-0010(53) includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials, or any other wastes.

"Pollution or water pollution" means such alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.

"Water" or "the waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or affect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control agricultural water pollution. Streamside vegetation provides three primary water quality functions: shade for cooler stream temperatures, streambank stability, and filtration of pollutants. Other water quality functions include: water storage for cooler and later season flows, sediment trapping that builds streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides.

Additional reasons for the Ag Water Quality Program's emphasis on streamside vegetation include:

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- Streamside vegetation improves water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation provides fish and wildlife habitat.
- Landowners can improve streamside vegetation in ways that are compatible with their operation.
- Streamside vegetation condition can be monitored readily to track the status and trends of agriculture's progress in addressing water quality concerns.

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streams can provide to protect water quality. Site-capable vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods) and historical and current human influences (e.g., channelization, roads, invasive species, modified flows, past land management). Site-capable vegetation can be determined for a specific site based on: current streamside vegetation at the site, streamside vegetation at nearby reference sites with similar natural characteristics, NRCS soil surveys, and local or regional scientific research.

The goal for Oregon's agricultural landowners is to provide the water quality functions (e.g., shade, streambank stability, and filtration of pollutants) produced by site-capable vegetation along all streams flowing through agricultural lands. The agricultural water quality regulations for each Management Area require that agricultural activities provide water quality functions consistent with what the site would provide with site-capable vegetation.

In some cases, for narrow streams, mature site-capable vegetation may not be needed. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature vegetation is important. Limited exceptions include:

- Junipers are mature site-capable vegetation in central and eastern Oregon, but they reduce bank stability and increase erosion,
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality.

1.5 Other Water Quality Programs

1.5.1 Confined Animal Feeding Operation (CAFO)

ODA is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators and producers do not contaminate ground or surface water with animal manure. Since the early 1980s, CAFOs have been registered to a general Water Pollution Control Facility permit designed to protect water quality, while allowing the operators and producers to remain economically viable. A properly maintained CAFO does not pollute ground or surface water. To assure continued protection of ground and surface water, ODA was directed by the 2001 Oregon State Legislature to convert the CAFO Program from a Water Pollution Control Facility permit program to a federal National Pollutant Discharge Elimination System (NPDES) program. ODA and DEQ jointly issued a NPDES CAFO Permit in 2003 and 2009. The 2009 permit will expire in May 2014, and it is expected that a new permit will be issued at that time. The NPDES CAFO Permit is compliant with all Clean Water Act requirements for CAFOs; it does allow discharge in certain circumstances as long as the discharge does not violate Water Quality Standards.

Oregon NPDES CAFO Permits require the registrant to operate according to a site-specific, ODA approved, Animal Waste Management Plan that is incorporated into the NPDES CAFO Permit by reference. CAFO NPDES Permits protect both surface and ground water resources.

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1.5.2 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and the Oregon Health Authority encourage community-based protection and preventive management strategies to ensure that all public drinking water resources are kept safe from future contamination. For more information see: www.deq.state.or.us/wq/dwp/dwp.htm. Agricultural activities are required to meet those water quality standards that contribute the safe drinking water.

1.5.3 Groundwater Management Areas (GWMAs)

Groundwater Management Areas are designated by DEQ when groundwater in an area has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. Once the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is formed. The committee then works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

Oregon has designated three GWMAs because of elevated nitrate concentrations in groundwater. These include the Lower Umatilla Basin GWMA, the Northern Malheur County GWMA, and the Southern Willamette Valley GWMA. Each GWMA has a voluntary Action Plan to reduce nitrate concentrations in groundwater. If after a scheduled evaluation point DEQ determines that the voluntary approach is not effective, then mandatory requirements may become necessary.

1.5.4 Pesticide Management and Stewardship

The ODA Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon, under the Federal Insecticide Fungicide Rodenticide Act. ODA's Pesticide Program administers regulations relating to pesticide sales, use, and distribution, including pesticide operator and applicator licensing, as well as proper application of pesticides, pesticide labeling, and registration.

In 2007, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from ODA, Oregon Department of Forestry, DEQ, and the Oregon Health Authority. The WQPMT facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT relies on monitoring data from the Pesticides Stewardship Partnership (PSP) Program and other monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections can be addressed through multiple programs and partners, including the PSP Program described above.

Through the PSP Program, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (www.deq.state.or.us/wq/pesticide/pesticide.htm). DEQ, ODA, and Oregon State University Extension Service work with landowners, SWCDs, watershed councils, and other local partners to voluntarily reduce pesticide levels while improving water quality and crop management. There has been noteworthy progress since 2000 in reducing pesticide concentrations and detections.

ODA led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon (www.oregon.gov/ODA/PEST/water_quality.shtml). The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources,

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and preventing human disease. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by the U.S. EPA and Oregon in both agricultural and non-agricultural settings.

1.5.5 The Oregon Plan for Salmon and Watersheds

In 1997, Oregonians began implementing the Oregon Plan for Salmon and Watersheds referred to as the Oregon Plan (www.oregon-plan.org). The Oregon Plan seeks to restore native fish populations, improve watershed health, and support communities throughout Oregon. The Oregon Plan has a strong focus on salmon, because they have such great cultural, economic, and recreational importance to Oregonians, and because they are important indicators of watershed health. ODA's commitment to the Oregon Plan is to develop and implement Area Plans and associated regulations throughout Oregon.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality (DEQ)

The U.S. EPA has delegated authority to DEQ under the CWA authority for protection of water quality in Oregon. In turn, DEQ is the lead state agency with overall authority to regulate for water quality in Oregon. DEQ coordinates with other state agencies, including ODA and Oregon Department of Forestry, to meet the needs of the CWA. DEQ sets water quality standards and develops TMDLs for impaired waterbodies. In addition, DEQ develops and coordinates programs to address water quality including National Pollution Discharge Elimination Permits (for point sources), 319 program, Source Water Protection, 401 Water Quality Certification, and GWMAs. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans as part of its 319 program.

DEQ designated ODA as the Designated Management Agency for water pollution control activities on agricultural and rural lands in the state of Oregon to coordinate meeting agricultural TMDL load allocations. A Memorandum of Agreement (MOA) between DEQ and the ODA recognizes that ODA is the agency responsible for implementing the Ag Water Quality Program established under ORS 568.900 to ORS 568.933, ORS 561.191, and OAR Chapter 603, Divisions 90 and 95. The MOA between ODA and DEQ was updated in 2012 and describes how the agencies will work together to meet agricultural water quality requirements.

The MOA includes the following commitments:

- ODA will develop and implement a monitoring strategy, as resources allow, in consultation with DEQ.
- ODA will evaluate Area Plans and regulation effectiveness in collaboration with DEQ.
    - ODA will determine the percentage of lands achieving compliance with Management Area regulations.
    - ODA will determine whether the target percentages of lands meeting the desired land conditions, as outlined in the goals and objectives of the Area Plans, are being achieved.
- ODA and DEQ will review and evaluate existing information with the objective of determining:
    - Whether additional data are needed to conduct an adequate evaluation.
    - Whether existing strategies have been effective in achieving the goals and objectives of the Area Plan.
    - Whether the rate of progress is adequate to achieve the goals of the Area Plan.

The Environmental Quality Commission, which serves as DEQ's policy and rulemaking board, may petition ODA for a review of part or all of any Area Plan or its associated regulations. The petition must

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allege with reasonable specificity that the Area Plan or associated regulations are not adequate to achieve applicable state and federal water quality standards (ORS 568.930(3)(a)).

1.6.2 Other Partners

ODA and SWCDs work in close partnership with local, state, and federal agencies and organizations, including: DEQ (as indicated above), the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and Farm Service Agency, watershed councils, Oregon State University Extension Service, livestock and commodity organizations, conservation organizations, and local businesses. As resources allow, SWCDs and local partners provide technical, financial, and educational assistance to individual landowners for the design, installation, and maintenance of effective management strategies to prevent and control agricultural water pollution.

1.7 Measuring Progress

Agricultural landowners and operators have implemented effective conservation projects and management activities throughout Oregon to improve water quality for many years. However, it has been challenging for ODA, SWCDs, and LACs to measure this progress. ODA is working with SWCDs, LACs, and our partners to develop and implement objectives and strategies that will produce measurable outcomes for agricultural water quality.

1.7.1 Measurable Objectives

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and load allocations where TMDLs have been completed. Many of these measurable objectives relate to land condition and are mainly implemented through focused work in small geographic areas (section 1.7.3). The measurable objectives for this Area Plan are in Chapter 3, and progress toward achieving the objectives is summarized in Chapter 4.

At a minimum, the measurable objectives of the Ag Water Quality Program and this Area Plan are to:

- Increase the percentage of lands achieving compliance with the regulations.
- Increase the percentage of lands meeting desired land conditions outlined in the Area Plan.

1.7.2 Land Condition and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, streamside vegetation is generally used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and nutrients, because many pesticides and nutrients adhere to sediment particles.

The Ag Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over them.
- It can be difficult to separate agriculture's influence on water quality from other land uses.
- It requires extensive monitoring of water quality at an intensive temporal scale to evaluate progress; it is expensive and may fail to demonstrate short-term improvements.
- Improved land conditions can be documented immediately, but there may be a significant lag time or a need for more extensive implementation before water quality improves.
- Agricultural improvements in water pollution are primarily through improvements in land and management conditions.

ED_454-000322884 EPA-6822_012504

Water quality monitoring data may help ODA and partners to measure progress or identify problem areas in implementing the Area Plan; although, as described above, it may be less likely to evaluate the short-term effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides.

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with significant water quality or land condition concerns that are associated with agriculture. ODA's intent in selecting Focus Areas is to deliver systematic, concentrated outreach and technical assistance in small geographic areas ("Focus Areas") through the SWCDs. A key component of this approach is measuring conditions before and after implementation to document the progress made with available resources. The focused implementation approach is consistent with other agencies' and organizations' efforts to work proactively in small geographic areas, and is supported by a large body of scientific research (e.g., Council for Agricultural Science and Technology, 2012).

Systematic implementation in Focus Areas can provide the following advantages:

- Measuring progress is easier in a small watershed than across an entire Management Area.
- Water quality improvement may be faster since small watersheds generally respond more rapidly.
- A proactive approach can address the most significant water quality concerns.
- Partners can coordinate and align technical and financial resources.
- Partners can coordinate and identify the appropriate source specific conservation practices and demonstrate the effectiveness of these conservation practices.
- A higher density of projects allows neighbors to learn from neighbors.
- A higher density of prioritized projects leads to greater connectivity of projects.
- Limited resources are used more effectively and efficiently.
- Work in one Focus Area, followed by other Focus Areas, will eventually cover the entire Management Area.

SWCDs choose a Focus Area in cooperation with ODA and other partners. In some cases, a Focus Area is selected because of efforts already underway or landowner relationships already established. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach and technical assistance, and to complete (or initiate) projects over a biennium. The current Focus Area for this Management Area is described in Chapter 3.

Working within a Focus Area is not intended to prevent implementation within the remainder of the Management Area. The remainder of the Management Area will continue to be addressed through general outreach and technical assistance.

Strategic Implementation Areas

Strategic Implementation Areas are small watersheds selected by ODA, in cooperation with partners, and after review of water quality and other available information. ODA leads the assessment of current conditions and the landowner outreach. Strategic Implementation Areas and Focus Areas are both tools to concentrate efforts in small geographic areas to achieve water quality standards. As with Focus Areas, SWCDs and partners work with landowners to improve conditions that may impact water quality. However, Strategic Implementation Areas also have a compliance evaluation and assurance process that allows ODA to proactively gain compliance with Ag water quality regulations.

ED_454-000322884 EPA-6822_012505

1.8 Implementation, Monitoring, Evaluation, and Adaptive Management

Implementation of the Area Plan and associated regulations will be assessed by evaluating the status and trends in agricultural land conditions. Measurable objectives will be assessed across the entire Management Area and within the Focus Area. ODA conducts land condition and water quality monitoring at the statewide level and will analyze this and other agencies' and organizations' local monitoring data. The results and findings will be summarized in Chapter 4 for each biennial review. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), objectives, and strategies in Chapter 3, as needed.

1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation

Starting in 2003, ODA began evaluating streamside vegetation conditions using aerial photos acquired specifically for this purpose. ODA focuses on land condition monitoring efforts on streamside areas because these areas have such a broad influence over water quality. Stream segments representing 10 to 15 percent of the agricultural lands in each Management Area were randomly selected for monitoring. ODA examines streamside vegetation at specific points in 90-foot bands along the stream from the aerial photos and assigns each sample stream segment a score based on ground cover. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site capable vegetation varies across the state, there is no one correct riparian index score. The main point is to measure positive or negative change. The results are summarized in Chapter 4 of the Area Plan.

1.8.2 Agricultural Ambient Water Quality Monitoring Assessment

ODA currently evaluates water quality data from monitoring sites in DEQ's water quality database that reflects agricultural influence on water quality. These data are also published in the DEQ water quality database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide. Results from monitoring sites in the Management Area, along with local water quality monitoring data, are described in Chapter 4.

1.8.3 Biennial Reviews and Adaptive Management

The Area Plan and associated regulations undergo biennial reviews by ODA and the LAC. As part of each biennial review, ODA, DEQ, SWCDs, and the LAC discuss and evaluate the progress on implementation of the Area Plan and associated regulations. This evaluation includes enforcement actions, landscape and water quality monitoring, and outreach efforts over the past biennium across the Management Area and for the Focus Area. In addition, progress toward achieving agricultural load allocations may be documented (if a TMDL has been established). As a result of the biennial review, the LAC submits a report to the Board of Agriculture and the director of ODA. This report describes progress and impediments to implementation, and recommendations for modifications to the Area Plan or associated regulations necessary to achieve the purpose of the Area Plan. The results of this evaluation will be used to update the goal(s), measurable objectives, and strategies in Chapter 3.

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Chapter 2: Local Background

2.1 Local Roles and Responsibilities

2.1.1 Local Advisory Committee (LAC)

This Area Plan was developed with the assistance of a LAC. The LAC was formed in 2001 to assist with the development of the Area Plan and regulations and with subsequent biennial reviews. Members are:

LAC Member	Area	Operation
Carol Ach	Leaburg, McKenzie and Coast Fork Willamette	Blueberries, cows, sheep, pigs
Dave Daniel	Pleasant Hill, Coast Fork Willamette	Nursery
Paul Day	Pleasant Hill, Middle Fork Willamette	Livestock, hay, pasture
Donald Hansen	Creswell, Coast Fork Willamette	Grass seed, strawberries, hazelnuts
Steve Houston	Eugene, Coast Fork Willamette	Wine grapes, seed crops, peppermint
Polly Kohl	Springfield, McKenzie	Rural resident, Mohawk Watershed Partnership
Glenn Miller	Eugene, Willamette	Hazelnuts
Art Paz	Springfield, McKenzie	Certified organic blueberries, timber
Alan Petersen, Chair	Springfield, McKenzie	Cattle, hay, timber
Garry Rodakowski	Vida, McKenzie	Hazelnuts
Karl Morgenstern		EWEB
Marc Paulman, Alternate	Dexter, Middle Fork Willamette	Cattle, hay
Jim Sly, Alternate	Creswell, Coast Fork Willamette	Cattle, hay
Jim Goodpasture, Alternate	Vida, McKenzie	Hazelnuts, cattle, hay, timber

2.1.2 Local Management Agency

The implementation of this Area Plan is accomplished through an Intergovernmental Agreement between ODA and the Upper Willamette SWCD. This Intergovernmental Agreement defines the SWCD as the Local Management Agency for implementation of the Area Plan. The SWCD was also involved in development of the Area Plan and associated regulations.

2.2 Area Plan and Regulations: Development and History

The Area Plan and regulations were approved by the director of ODA in June 14, 2002.

ED_454-000322884 EPA-6822_012507

Since approval, the LAC met in 2004, 2008, 2010, and 2012 to review the Area Plan and regulations. The review process included assessment of the progress of Area Plan implementation toward achievement of plan goals and objectives.

A summary of dates and major changes from each biennial review can be included in this section.

2.3 Geographical and Physical Setting

2.3.1 Location, Water Resources, Land Use, Land Ownership, Agriculture

Physical Features

The headwaters for the McKenzie River and Middle Fork are in the Cascade Mountains. The Coast Fork originates in the Calapooya Mountains. The Coast Fork and Middle Fork meet near Goshen to form the Willamette River mainstem. The Willamette River's confluence with the McKenzie River is approximately 15 miles further downstream near Coburg.

The McKenzie River originates from Clear Lake and flows westward through a narrow valley down a steep gradient. It has eight main tributaries: Lost Creek, Horse Creek, McKenzie South Fork, Quartz Creek, Smith River, Blue River, Gate Creek, and Mohawk River. The Mohawk River has the flattest gradient of the tributaries, and there is some relatively level land along it. Level land also extends along the main stem of the McKenzie River.

The Middle Fork River begins at Timpanogas Lake and flows northwest down a steep gradient until it reaches the Willamette Valley floor. Most of its tributaries, including Hills Creek, Salt Creek, Salmon Creek, North Fork, Fall Creek, and Little Fall Creek, flow into the mainstem from the north. Lost Creek flows into the Middle Fork from the south.

The Coast Fork River begins in the Calapooya Mountains, as do several of its tributaries, Brice Creek, Row River, Sharps Creek, Layng Creek, and Mosby Creek. Layng, Sharps, and Brice creeks have relatively steep gradients from headwaters to confluence with the Coast Fork, while Mosby Creek, Row River, and the mainstem Coast Fork have relatively flat gradients. The gradient of the Coast Fork flattens further after it reaches the Willamette Valley floor. Several tributaries, including Camas Swale Creek and Silk Creek, flow into the Coast Fork as it flows north through the valley.

Geology and Soils

Western and High Cascade Mountains

The Cascade Mountains consist of two adjacent mountain ranges, the Western and High cascades. Both ranges are predominantly composed of basaltic lava flows, with lesser amounts of andesite and rhyodacite (Orr et al, 1992). Depending on the hardness of the underlying material, the mainstem and tributaries of the upper Middle Fork and McKenzie rivers have created both steep gorges and gently sloping plateaus. The upper reaches of the McKenzie River have been glaciated, at least as far west as Blue River Reservoir (Boer, personal communication, 2000).

Calapooya Mountains

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The Calapooya Mountains are a mixture of sedimentary and older volcanic rocks. They have been deeply dissected by the Coast Fork and its tributaries. Soils are deep, well-drained silty clay loams and clay loams from sandstone, sediment, and igneous rock (Patching, 1987).

Willamette Valley

Much of the lowlands in the Willamette Valley are alluvium, or material deposited by the rivers and their tributaries. Alluvial materials include sands, gravels, and silts transported from the Calapooya and Cascade mountains. Depending on the composition of the deposited material, soils in bottomlands and terraces range from excessively drained gravelly sandy loam to poorly drained silty clay loam and silty clay (Patching, 1987).

Climate

The McKenzie, Middle Fork, and Coast Fork watersheds experience the same general climate, with wet winters and dry summers. Precipitation generally increases with elevation in the watersheds, ranging from an average of 40 to 50 inches per year on the valley floor to 70 to 80 inches at the summit of the Calapooya Mountains, 80 inches at the headwaters of Little Fall Creek in the Middle Fork watershed, and 110 inches at the headwaters of Blue River in the McKenzie watershed (University of Oregon Department of Geography, 1999). In the upper portions of the watersheds, above 4,000 to 5,000 feet, snow is a significant portion of the precipitation.

Agriculture and Forestry

The predominant land use in the Management Area is forestry. Forestlands comprise approximately 86 percent of the land within the three watersheds (Table 1). Most forestland is in the upper portions of the three watersheds in the Cascade and Calapooya Mountain ranges and extends down the eastern side of the valley floor. The U.S. Forest Service, the Bureau of Land Management, and private industrial landowners are major forestland holders in the watersheds (Table 2).

Agricultural and rural residential land uses in the Management Area are found in the lower valley regions of the three watersheds. These lands account for approximately four percent of the Management Area (Table 3). In the McKenzie watershed, most agricultural lands are in the floodplain, where well-drained sandy loam soils have accumulated by fluvial (rivers and streams) processes. Hazelnuts are a major crop in the watershed, with over 1,200 acres in orchards (Penhallegon, personal communication, 2000). Other commercial crops include blueberries, Christmas trees, peppermint, and row crops. Livestock and pasturelands are the major land use on the Mohawk tributary.

Most of the agricultural land in the Middle Fork watershed is located in the lower portion adjacent to the Willamette River. There is very little land in agricultural use above Dexter Reservoir. The dominant agricultural land use is pasture and hayland. There are some row crops near Jasper, Lowell, and Pleasant Hill. There are also several nurseries, Christmas tree farms and orchards in that area.

The Coast Fork watershed supports agricultural lands from the confluence of the Coast Fork and Middle Fork upstream beyond Cottage Grove. Grass seed, pasture and hayland are the predominant commodities in the watershed. Other agricultural land uses include nurseries, small grains, orchards, vineyards, and field crops.

Table 1. Land uses and land cover in the three watersheds.

Land Use/	Acres	Percent of Land

ED_454-000322884 EPA-6822_012509

Land Cover Category		Use by Category
Agriculture	82,000	4
Forestry	1,858,000	86
Urban/Residential/Other	216,100	10
TOTAL	2,156,100	100

Table 2. Land ownership in the three watersheds.

Landowner/Manager	Acres	Percent of Land
U.S. Forest Service	1,044,600	48
Private Landowners	690,200	32
Forest Service Wilderness Area	255,300	11.8
Bureau of Land Management	142,660	6.6
U.S. Army Corps of Engineers	17,600	0.8
Lane County	2,200	0.1
State of Oregon	2,130	0.1
State Scenic Waterway	1,120	0.1
Joint Corps of Engineers/Lane County	160	0.01
State Parks and Recreation	130	0.01
TOTAL	2,156,100	100

Table 3. Agricultural Lands in the McKenzie, Middle Fork, and Coast Fork.

Watershed	Agricultural Land (acres)	Agricultural Land (percent of all land)
McKenzie	34,000	3.9
Middle Fork	14,000	1.6
Coast Fork	34,000	7.9
TOTAL	82,000	4.0

Cities/Urban

There is one major metropolitan area in the Management Area, as well as smaller cities and rural communities. Most cities are located along the mainstems of the Middle Fork, Coast Fork, and McKenzie rivers. Rural communities co-exist with agricultural areas and are situated on or near the rivers or their tributaries. Both the Willamette and McKenzie flow through the Eugene/Springfield area, and their confluence is just north of Eugene. The 2011 population of the Eugene/Springfield area is over 213,000 with growth percentages higher than the state average over the past ten years. Rural communities include Marcola in the Mohawk watershed; and Blue River, Walterville, Leaburg, Vida, Nimrod, Finn Rock, and McKenzie Bridge along the McKenzie River. Most of these communities have populations below 500. Two incorporated cities exist along the Coast Fork watershed: Cottage Grove, with 9,686 residents, and Creswell, with 5,031 residents. Rural communities in the Coast Fork watershed include Disston, Culp Creek, Dorena, London, Latham, Saginaw, Walker, Delight Valley, Cloverdale, and Goshen. Along Highway 58, the cities of Oakridge (pop. 3,205), Lowell (pop. 1,045) and Westfir (pop. 278) are located centrally in the Middle Fork watershed (Population Research Center, 2011). Rural communities in the Middle Fork watershed include Dexter, Fall Creek and Jasper.

Roads

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There is an extensive network of public and private roads within the three watersheds. Heavily traveled public roads include Interstate 5, which runs north-south through Eugene-Springfield, Creswell, and Cottage Grove; Highway 126, the main route through the McKenzie watershed over the Cascade Mountains; and Highway 58, which begins near Goshen and travels southeast over the Cascades.

Recreation

Recreation within the Management Area relates closely to the scenic landscape. Activities such as camping, hiking, fishing, hunting, skiing, and boating draw thousands of visitors to the three watersheds every year. Several reservoirs provide recreational opportunities in the summer months, including Dorena Reservoir on the Row River, Dexter Lake on the Middle Fork, and Cougar Reservoir on the McKenzie. Table 5 provides a complete list of recreational reservoirs in the Management Area.

Watershed Functions

Other functions of land in the watersheds include retention and slow release of rainwater, flood control, groundwater recharge, and filtration of pollutants. All watersheds provide these functions to some degree depending on local conditions and the amount and types of developments.

Water Resources

Water Availability

Both rainwater and snowmelt contribute to water supplies in the three watersheds. More surface water is supplied by snowmelt in the McKenzie and Middle Fork watersheds than in the Coast Fork because their headwaters are in the High Cascades. Flows in the McKenzie and Middle Fork are less variable than in the Coast Fork. Coast Fork seasonal flow patterns are more similar to streams originating in the Coast Range, with flows in the winter greatly exceeding summer flows even with human-caused changes to the flow regime. Summary flow data for the McKenzie, Middle Fork, and Coast Fork are listed in Table 4.

Table 4. Average annual, summer, and winter flows in cubic feet per second (cfs) for the McKenzie, Middle Fork and Coast Fork (U.S. Geological Survey, 2000).

Watershed	Average Annual Flow (cfs)	Average Summer Flow (cfs)	Average Winter Flow (cfs)
Coast Fork at Goshen	1611	416	3342
McKenzie at Coburg	5897	3183	9582
Middle Fork at Jasper	4154	2318	6433

Groundwater is most plentiful in the three watersheds in areas with alluvial deposits and porous lava flows. The High Cascades store a great deal of water from snowmelt, and the release of this water during the summer helps keep flows relatively constant in the McKenzie and Middle Fork watersheds. Alluvial deposits from the mouth of the Middle Fork to Dexter Dam, at the mouth of the McKenzie, along the McKenzie to Belknap Springs, and along the Coast Fork on the Willamette Valley floor, store large quantities of groundwater.

Dams and Reservoirs

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Thirteen dams and reservoirs in the three watersheds are used for flood control in the winter and flow augmentation in the summer. They also provide recreation, irrigation, and power generation. Table 5 summarizes the uses of each dam and reservoir, storage capacities, and priority for augmentation of summer flows in the Willamette River.

The reservoirs influence seasonal water availability and flow patterns in the three watersheds. Summer water releases boost flows in the McKenzie to one-third higher than normal (Lane Council of Governments, 1996). The Coast Fork, once an ephemeral river, now flows year-round because of summer water releases from Dorena and Cottage Grove reservoirs.

Table 5. Uses, Capacities, and Drawdown Priority for Reservoirs in the Management Area (U.S. Army Corps of Engineers, 2000; Oregon Water Resources Department, 2000).

Watershed	Project	Uses of Water	Summer Reservoir Storage Capacity (Acre-feet)	Summer Drawdown Priority
Coast Fork	Cottage Grove	Recreation, flood control	28,700	5
Coast Fork	Dorena	Recreation, flood control	65,000	5
McKenzie	Blue River	Recreation, summer flow augmentation, flood control	78,800	3
McKenzie	Carmen	Hydropower	261	N/A
McKenzie	Cougar	Hydropower, recreation, summer flow augmentation, flood control	143,900	2
McKenzie	Leaburg	Hydropower, recreation	345	N/A
McKenzie	Smith	Hydropower	15,000	N/A
McKenzie	Trail Bridge	Hydropower	2,263	N/A
McKenzie	Walterville	Hydropower	100 (Intake) 345 (S. Pond)	N/A
Middle Fork	Dexter	Re-regulate flow from Lookout Point Reservoir, recreation	N/A	N/A
Middle Fork	Fall Creek	Recreation	108,200	5
Middle Fork	Hills Creek	Recreation	194,600	4
Middle Fork	Lookout Point	Flood control, hydropower	324,200	1

Water Use

Consumptive uses of water in the three watersheds include irrigation, municipal use, and commercial use. Irrigation is the primary consumptive use for which water rights are issued. Municipal water rights supply drinking water to several hundred thousand people in Lane County. Non-consumptive uses include recreation, power generation, and fish and wildlife habitat. Sources of appropriated water are reservoirs, surface water, and groundwater. Table 6 summarizes water allocations in the three watersheds. Actual water use is typically lower than water appropriated.

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Table 6. Appropriations of surface water, groundwater, and reservoir water in the three watersheds (Oregon Water Resources Department, 2000). Appropriations are in cubic feet per second (cfs) and acre-feet (af).

	McKenzie		Middle Fork		Coast Fork	
Water Use	cfs	af	cfs	af	cfs	af
Irrigation	274	49,000	52	10,173	110	21,507
Fish and Wildlife	292	45	93	47	6	35
Agriculture	1	3	1	11	4	11
Industrial	10,078	18,493	30	620	45	793
Municipal	338	0	50	0	40	1
TOTALS	10,983	67,541	226	10,851	205	22,347

In the McKenzie, over 9,975 cubic feet per second of industrial water rights are appropriated for hydropower, a non-consumptive use.

2.3.2 Geographic and Programmatic Scope

The Management Area includes the McKenzie, Middle Fork of the Willamette (Middle Fork), and Coast Fork of the Willamette (Coast Fork) watersheds. The watersheds are located primarily in the eastern portion of Lane County in western Oregon. Small portions of the McKenzie and Coast Fork watersheds are also located in Linn and Douglas counties. Communities in the Management Area include the cities of Springfield, Lowell, Oakridge, Westfir, Creswell, and Cottage Grove, as well as several unincorporated communities mentioned in Section 2.1.5.

Boundaries of the Management Area are the Cascade Mountains to the east, Calapooya Mountains to the south and west, Long Tom watershed to the west, and the Coburg Hills to the north. The three watersheds cover approximately 3,361 square miles, or 2,156,080 acres. Elevations range from about 350 feet above sea level near the mouth of the McKenzie to 10,354 feet on the North Sister in the Cascades (Oregon Water Resources Board, 1961). The McKenzie's confluence with the Willamette near Coburg is the furthest point downstream in the Management Area.

2.3.3 Map of the Management Area

Figure 3: Southern Willamette Valley Agricultural Water Quality Management Area.

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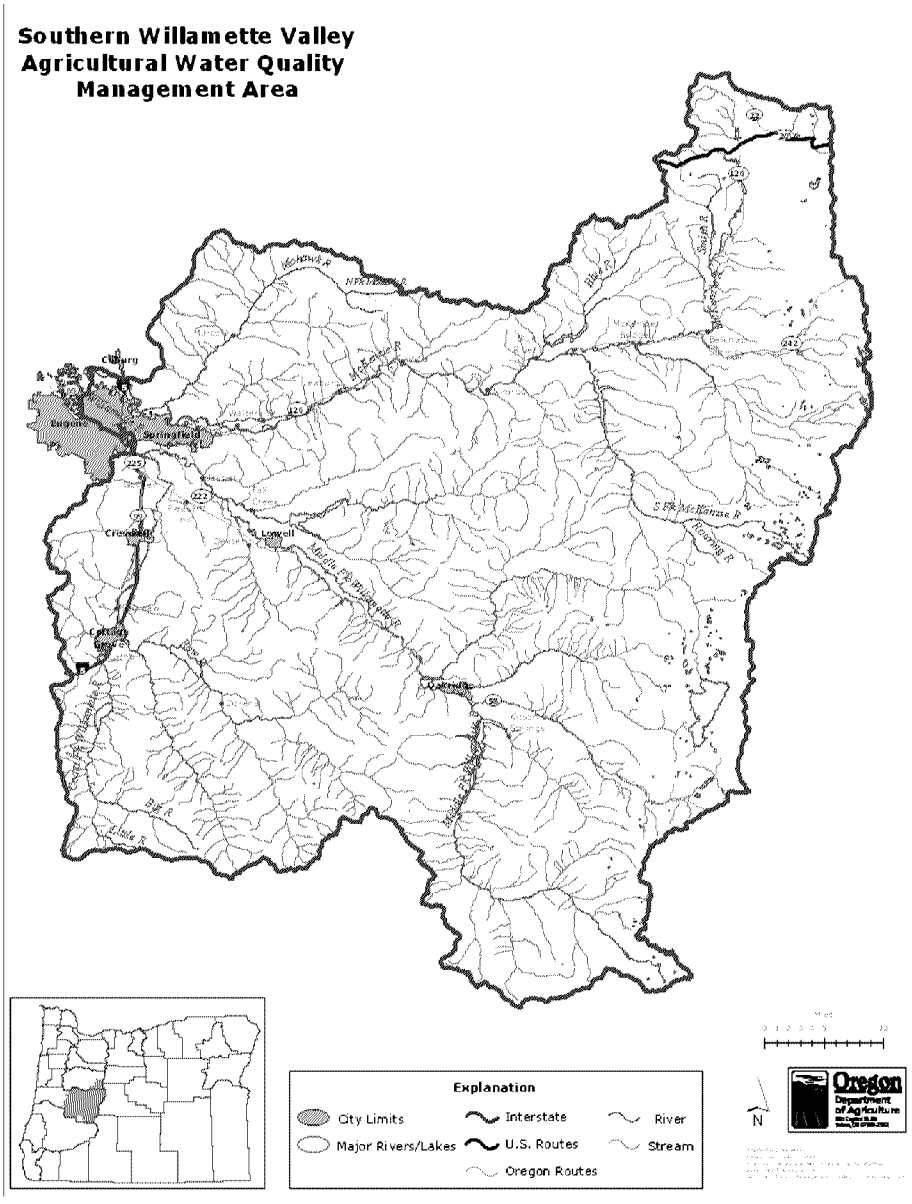

2.4 Agricultural Water Quality in the Management Area

2.4.1 Local Issues of Concern

Within the Management Area, several segments of the three main rivers and their tributaries have been identified by the DEQ as "water quality limited" and are on the 303(d) list of water quality limited waterbodies. As shown in Appendix C, sixty-two stream segments in the three watersheds are listed for temperature (although these are listed, they are covered by the TMDL), five segments are listed for low dissolved oxygen levels, and five segments in the Coast Fork and two segments in the McKenzie subbasin are listed for toxics (mercury).

2.4.2 303(d) List of Impaired Water Bodies

In response to the 303(d) listings through 2006, DEQ developed TMDLs for the entire Willamette Basin for temperature, bacteria (*E. coli)*, and mercury (Oregon Department of Environmental Quality, 2006). The Willamette TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/willamette.htm). The Willamette Basin also has a TMDL for dioxin (Oregon Department of Environmental Quality, 1991). The dioxin TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/columbia.htm#dd). Other impairments identified in the Management Area, such as flow and habitat modification, do not require TMDLs. Table 4 summarizes the agricultural load allocations that apply to the Management Area.

The Willamette mainstem is also listed for several toxins, iron, and dioxin, but these are beyond the scope of this Area Plan. If a Willamette Basin TMDL is developed in the future for any of the toxins, it may include agricultural load allocations that apply to the entire Management Area.

While this Area Plan applies to all agricultural water pollution, it focuses specifically on parameters on the 303(d) list and TMDLs in the Management Area including temperature, bacteria (*E. coli)*, and mercury. Appendix C lists the impaired waterbodies from the 2010 303(d) list. More information is available in the 2010 integrated report and 303(d) list database on the DEQ website (www.deq.state.or.us/wq/assessment/2010Report.htm).

2.4.3 Basin TMDLs and Agricultural Load Allocations

Temperature
DEQ endeavored to set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Management Area. Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Many sources contribute to elevated stream temperatures. On agricultural lands, absence of streamside vegetation, water withdrawals, and land management that leads to widened stream channels contribute to elevated stream temperatures. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities.

Bacteria
DEQ has set the bacteria *Escherichia coli (E. coli)* TMDL to protect human water contact recreation (risk of infection and disease to people who come in contact with fresh water while fishing, swimming, or boating), the most sensitive beneficial use. On agricultural lands, *E. coli* generally comes from livestock waste, either deposited directly into waterways or carried to waterways via runoff and soil erosion. Runoff and soil erosion from agricultural lands may also carry bacteria from other sources. There are numerous sources of bacteria in streams, including humans (from recreation, failing septic systems, or discharges from wastewater treatment plants) and wildlife.

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Mercury
Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. On agricultural lands, if mercury is contributed it is through eroded soils.

Other Parameters of Concern:

Sediment
A TMDL has not been set for sediment, but it can be of concern related to agricultural lands. Sediment carried in streams can adversely affect aquatic life by increasing water temperature through thermal absorption, reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. Sediment deposition can also change the width:depth ratio of a stream, which directly influences stream temperature. Potential sources of sediment include streambank erosion, home building or construction sites, and runoff from agricultural lands.

Nutrients
A TMDL has not been set for nutrients, but it can be of concern related to agricultural lands. Fertilizers and manure are the main agricultural sources of nutrients. Improper storage or application can result in discharge of nutrients into either surface or ground water. Fertilizer run-off has been identified as one of the major contributing factors to algae blooms, including harmful algae blooms containing toxin-producing cyanobacteria species. In the recent past, Oregon Health Authority has issued algae bloom advisories for Dorena Reservoir, Dexter Reservoir, and Hill Creek Reservoir. Nutrients can also come from waste discharge, runoff, or seepage from urban areas, industrial and wastewater treatment plants, and septic systems, sediment runoff from forestlands, and background sources.

Aquatic Weeds and Algae
Harmful algal blooms are caused by over-production of naturally occurring cyanobacteria (blue-green algae). Some species release toxins that are harmful to humans, livestock, pets, and wildlife. When levels of nutrients, temperature, pH, and light are optimal, cyanobacteria grow rapidly, resulting in blooms where cyanobacteria are the dominant form of life in their environment. Cyanobacteria can cause negative impacts to water quality, including: taste and odor problems in drinking water, unpalatable fish, elevated pH levels, and low dissolved oxygen levels. Nutrients entering the watershed from agricultural activities can accumulate in reservoirs or lakes and may fuel algal blooms and move downstream. Low stream flows and high water temperatures downstream could also make conditions favorable for an algal bloom.

In addition to the Willamette Basin TMDLs, TMDLs for phosphorus and ammonia were developed for the Coast Fork watershed in 1996 to address low dissolved oxygen and high pH levels.

Table 4: Agricultural Load Allocations that Apply to the Management Area

Geographic Scope in Management Area	TMDL	Load Allocation for Agriculture
Parameter: Temperature		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human use allocation (with a surrogate of effective

ED_454-000322884 EPA-6822_012516

		shade)
McKenzie Subbasin	Willamette TMDL (2006), Chapter 11	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human human use allocation (with a surrogate of effective shade)
Middle Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 12	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human human use allocation (with a surrogate of effective shade)
Coast Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 13	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05°C of the 0.3°C human human use allocation (with a surrogate of effective shade)
Parameter: Bacteria		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	66 to 83% reduction from agricultural areas compared to average loads in 2006
Parameter: Mercury		
Entire Management Area	Willamette TMDL (2006), Chapter 3	Agriculture: 27 percent reduction compared to average loads in 2006
Parameter: Dioxin		
Entire Management Area	Columbia River Basin TMDL (1991)	Only pulp and paper mills have been assigned an allocation; agriculture is a potential source, but no load allocation has been assigned due to lack of data

2.4.4 Beneficial Uses and Parameters of Concern

Beneficial uses of water in the three watersheds include water contact recreation; habitat for aquatic organisms and wildlife; agricultural, domestic, municipal, and industrial water supplies; and aesthetics (Appendix D). A waterbody is placed on the 303(d) list for a particular parameter when water quality is deemed no longer adequate to protect the most sensitive beneficial use. Beneficial uses impacted by temperature in the three watersheds include bull trout habitat and salmon spawning and rearing habitat. Mercury in the Coast Fork Willamette has appeared in fish tissues in elevated levels, endangering aquatic life and preventing human consumption of fish. Water contact recreation is impacted in the Coast Fork because of high bacteria levels. High concentrations of phosphorus promote growth of algae, impact pH levels, and lower dissolved oxygen levels.

ED_454-000322884 EPA-6822_012517

2.4.5 Sources of Impairment

Within the Management Area, several segments of the three main rivers and their tributaries have been identified by the DEQ as "water quality limited" and are on the 303(d) list of water quality limited waterbodies. As shown in Appendix C, sixty-two stream segments in the three watersheds are listed for temperature (although these are listed, they are covered by the TMDL), five segments are listed for low-dissolved oxygen levels, and five segments in the Coast Fork and two segments in the McKenzie subbasin are listed for toxics (mercury).

2.5 Prevention and Control Measures

Each section is intended to include an overview of the issue, the regulations, and beneficial or available management practices. At a minimum, sections on riparian areas, waste, and sediment should be included. (Note: If prevention and control measures are called something else in this Area Plan and Area Rules, i.e., prohibited conditions or regulations, this will need to be clarified for this Area Plan). Area Plans incorporate the Area Rule language in the appropriate Prevention and Control Measures section in a highlighted box to be kept separate from the plan. Either within the first paragraph or an introduction to this section, language should be included that the goals are achieved through Prevention and Control Measures, which includes both voluntary practices and requirements.

This section provides the primary discussion of the measures that individual landowners or operators should consider implementing on their property for the prevention and/or control of sources of water pollution associated with agricultural activities. It contains discussion of a landowner's responsibilities concerning the particular issue. Prevention and control measures vary with local management area issues and may include irrigation management, upland management, erosion control, livestock management, and other areas of local concern. Sample text can be found in the Mid Coast Area Plan related to Waste, Riparian Areas, and Fine Sediment. Text for each section is not required, but available.

The focus of the Agricultural Water Quality Program is on voluntary and cooperative efforts by landowners, the ODA, and others to protect water quality. However, the Agricultural Water Quality Management Act also provides for a regulatory backstop to ensure prevention and control of water pollution from agricultural sources in cases where landowners or operators refuse to correct problem conditions. Agricultural Water Quality Management Area Rules serve as this backstop while allowing landowners flexibility in how they protect water quality. Area Rules are goal-oriented and describe characteristics that should be achieved on agricultural lands, rather than practices that must be implemented.

This LAC developed Area Rules (Characteristics to Achieve) to protect water quality and prevent and control water pollution from agriculture. The LAC also considered the time and expense that would be involved for area landowners to meet the rules. As a result, each rule has an implementation date the LAC believed would be acceptable to area landowners.

This Area Plan serves as a guidance document, and as stated in the Foreword, does not establish provisions for enforcement. The Area Rules developed with input from the LAC, OARs 603-095-2100 to 603-095-2160, are included in this document only as a reference for landowners. Each Area Rule has a border around it and appears in italics.

The Characteristics to Achieve and Area Rules relate directly to water quality concerns identified on the 303(d) list in the Management Area, and for the bacteria, mercury and temperature TMDLs that were established in September 2006. Rules specific to mercury are not developed, but Area Rules in the

ED_454-000322884 EPA-6822_012518

Characteristics to Achieve for waste, riparian areas, and erosion/nutrients are also effective for control of mercury. The concerns addressed in the Area Rules are:

- Temperature
- Phosphorus
- Bacteria
- Toxics
- Mercury

2.5.1 Nutrients and Manure Management

Characteristic to Achieve for Waste

Issue: Oregon Revised Statute 468B.025 is an existing statute that addresses water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Rules in the state. For more information and text of ORS 468B.025 and 468B.050, please consult Appendix H.

Characteristic to Achieve

OAR 603-095-2140
(1)(a) Waste. Effective upon rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

Parameters Addressed by this Characteristic to Achieve:

Bacteria, toxics, and mercury

2.5.2 Riparian/Streamside Area Management

Note: This language should be used if the Area Plan does not currently have adequate language to address the role of streamside vegetation. This information is more important to the landowner, and Chapter 2 is intended as the landowner guide.

Characteristic to Achieve for Riparian Areas Issue: The intent of this measure is to maintain and protect riparian vegetation, minimize erosion of streambanks due to agricultural activities, allow water percolation into the soil, and encourage shading of streams, thus providing proper function of the riparian area.

Landowners are not responsible for streambank erosion resulting from natural channel migration and meander formation (OAR 603-095-2140(1)).

Please consult Appendix J for more background information on this Characteristic to Achieve.

ED_454-000322884 EPA-6822_012519

Characteristic to Achieve

OAR 603-095-2140
(1)(b) Riparian areas. By January 1, 2004, agricultural management shall allow establishment and maintenance of vegetation along perennial streams consistent with the capability of the site to provide riparian functions necessary to help moderate solar heating and for streambanks to withstand flows resulting from a 25-year, 24-hour storm event.

Parameters Addressed by this Characteristic to Achieve:

Temperature.

Role of Streamside Vegetation to Prevent and Control Pollution

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement where needed to prevent and control agricultural water pollution. There are several reasons for this emphasis:

- Streamside vegetation improves water quality for multiple parameters, including: temperature, sediment, bacteria, nutrients, toxics, and pesticides.
- The presence of healthy streamside vegetation indicates that agriculture is addressing water quality concerns.
- Landowners have the authority and ability to take steps to improve streamside vegetation.
- Streamside vegetation provides additional functions, including fish and wildlife habitat.
- Streamside vegetation keeps water cool and banks stable.

Adequate streamside vegetation provides three primary water quality functions (Council for Agricultural Science and Technology, 2012; National Council for Air and Stream Improvement, 2000; State of Oregon, 2000). Local agricultural water quality regulations require that agricultural activities provide these functions *(text needs to be adjusted to state the functions required under the Management Area's specific rule)*:

- Stream temperature moderation (vegetation blocks direct solar radiation).
- Reduced streambank erosion (roots stabilize banks and dissipate stream energy).
- Filtration of pollutants (e.g., bacteria, nutrients, toxics, sediment) from overland flows.

Adequate streamside vegetation also provides additional water quality functions (see references listed in paragraph above):

- Water storage that provides cooler and longer duration late season flows.
- Sediment trapping that builds streambanks and floodplains.
- Infiltration of water into the soil profile.
- Narrowing and deepening of channels.
- Biological uptake of sediment, organic material, nutrients, and pesticides.
- Maintenance of streamside integrity during high flow storm events.

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streamsides need to provide the functions that prevent and control water pollution. Site-capable vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, wildlife, fire, floods) and historical and current human influences (e.g., channelization, roads, invasive species, past land management). Site-capable vegetation can be determined for a specific site based on: current streamside vegetation at the site, streamside vegetation at

Comment [JM1]: Does the LAC want to include part or all of the suggested language shown in Track Changes?

ED_454-000322884 EPA-6822_012520

nearby reference sites (with similar natural characteristics), NRCS soil surveys, and other scientific references.

In some cases, mature site-capable vegetation may not be needed to provide the three primary water quality functions. For example, mature trees may not be necessary to protect water quality; willows or other shrubs may suffice to provide adequate shade and protect streambanks on small streams.

In other cases, mature site-capable vegetation may not provide these three functions:

- Mature junipers are site-capable vegetation in central and eastern Oregon, but they reduce bank stability and increase erosion.
- Invasive grasses can be the dominant site-capable vegetation along streams, but they generally do not provide all of the required water quality functions.
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down cutting, but they do not improve water quality.

2.5.3 Soil Erosion Prevention and Control

Characteristics to Achieve for Erosion/Nutrients

Issue: The intent of these measures is to prevent water from carrying sediment and nutrients into waters of the state.

Characteristics to Achieve

OAR 603-095-2140
(1)(c) Erosion and Nutrients:
(A) By January 1, 2004, soil erosion from agricultural activities shall not exceed the tolerable soil loss T.
(B) By January 1, 2004, landowners or operators shall prevent pollution from irrigation surface water return flow to waters of the state.

Parameters Addressed by this Measure:

Phosphorus, toxics, and mercury

For more information on erosion and the tolerable soil loss T, please consult Appendix G.

2.5.4 Pesticides

Issue: The intent of this condition is to prevent introduction of pesticides, which include herbicides and fungicides, into waters of the state. Pesticide users should always read the label prior to storing, mixing, or applying pesticides. ORS 634.372 (2) and (4) require users to follow label recommendations for all pesticides. Please consult Appendix H for the text of ORS 634.372.4.5.

2.5.5 Mercury

Issue: Mercury is a metal, liquid at room temperature, commonly used in the recent past for thermometers. It continues to have many dental, medical, and industrial uses. It is found naturally in the soils of the Willamette Valley. It is also found in fossil fuels and is released into the air upon combustion. In the air, mercury can travel over continents and oceans to be deposited on land, added to naturally occurring mercury, and carried by storm water and erosion into Oregon's waterways. Fish consumption

ED_454-000322884 EPA-6822_012521

is the most common way humans are exposed to elevated levels of mercury (Oregon Department of Environmental Quality, 2007).

Mercury is also a severe poison. According to the DEQ (2007), small children and fetuses are most sensitive to mercury's toxic effects.

Mercury from point and non-point sources is bio-accumulating in fish tissue to levels that adversely affect public health. Mercury binds to particles; and there are both higher levels of total suspended solids as well as higher mercury levels in the wet season. In setting the TMDL for mercury, DEQ has found that erosion of native soil makes up almost 48 percent of the mercury in the Willamette Basin. Some industrial facilities and domestic wastewater treatment facilities also discharge mercury, but at low levels.

The current DEQ mercury TMDL consists of interim targets and allocations. Sometime in 2011 DEQ plans to finalize these after additional data collection and public outreach (Oregon Department of Environmental Quality, 2007).

Existing Area Rules help control mercury from agricultural sources by limiting erosion, filtering sediment, and controlling pollution. No specific rule to control mercury from agricultural activities is necessary at this time. Refer to the characteristics to achieve for waste, riparian area, and erosion/nutrients for the Area Rules that address mercury in this area.

2.5.6 Optional Issues: Upland Management, Irrigation Management, Livestock Management

Role of Upland Vegetation to Prevent and Control Pollution

Upland areas are the rangelands, forests, and croplands located upslope from streamside areas. Upland areas extend to the ridge-tops of watersheds. With a protective cover of crops and crop residue, grass (herbs), shrubs, or trees, these areas will capture, store, and safely release precipitation, thereby reducing the potential of excessive soil erosion or delivery of soil or pollutants to the receiving stream or other body of water.

Healthy upland areas provide several important ecological functions, including:

- Capture, storage, and moderate release of precipitation reflective of natural conditions.
- Plant health and diversity that support cover and forage for wildlife and livestock.
- Filtration of sediment.
- Filtration of polluted runoff.
- Plant growth that increases root mass, utilizes nutrients, and stabilizes soil to prevent erosion.

2.5.7 Menu of Optional Management Practices

Landowners are neither required to cease a specific practice nor implement a particular practice by the Area Plan or Rules. The following tables are intended as suggestions for landowners who want ideas on how to meet Area Rules and generally maintain and enhance natural resources on their property. The tables provide some idea of the water quality benefits of each practice as well as potential costs and benefits to landowners. The tables are organized by resource, such as nutrients and manure.

Landowners who want more information on any of the following practices, or who are looking for other ideas for water quality improvement and conservation on their lands, may contact several agencies and organizations that provide technical assistance, including the Upper Willamette SWCD, the NRCS, and the Oregon State University (OSU) Extension Service. Also, please consult Appendix I for a list of publications describing water quality improvement practices for agricultural landowners.

ED_454-000322884 EPA-6822_012522

Riparian Areas and Streams

Practice	Resource Concerns Addressed	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
a. Rotational grazing in riparian area; timed when growth is palatable to animals and when riparian areas are not saturated.	May help establish desirable riparian vegetation.	Allows limited use of riparian area for grazing, improves wildlife habitat.	Requires intense management to insure that grazing does not prevent site capable vegetation from establishing.
b. Livestock exclusion from riparian area; establishing off-stream watering facilities.	Helps promote desirable riparian vegetation; promotes streambank integrity; helps filter nutrients and sediment from runoff; may help narrow channel and reduce erosion in channel; reduces effects of solar radiation.	May lessen streambank erosion and loss of pastures; less time involved in managing livestock grazing in riparian area, improves wildlife habitat.	May require higher weed control costs in riparian areas than seasonal riparian grazing. May require financial investment for livestock control and off-stream watering facilities.
c. Planting perennial vegetation in riparian area.	Helps establish perennial riparian vegetation rapidly; promotes streambank integrity; may help narrow channel and reduce erosion in channel; reduces effects of solar radiation.	May lessen streambank erosion and loss of pastures. If livestock are excluded from riparian area, area may be eligible for federal cost-share programs. Some alternative perennial agricultural products may be harvested from riparian areas.	Costs of vegetation and weed control. May require financial investment for riparian fencing and off-stream watering facilities while vegetation establishes.

Nutrient and Manure Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply nutrients according to soil test results and at agronomic requirements.	Helps prevent nutrient and bacteria runoff into surface water or leaching into groundwater.	May help reduce fertilizer costs; ensures that plants receive needed nutrients for growth; makes plants more competitive against weeds.	Costs of soil testing; time associated with taking soil samples.
b. Store manure	Helps prevent nutrient and	Prevents nutrient	Cost of constructing

ED_454-000322884 EPA-6822_012523

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
under a tarp or roof; preferably on an impervious surface such as concrete or plastic.	bacteria runoff into surface water or leaching into groundwater.	leaching so manure applied on crops or pasture has higher nutrient content; may save some fertilizer costs; producers wishing to construct storage facilities may apply for funding programs.	manure storage facilities.
c. Establish animal heavy use areas, where animals can be confined during the winter to protect other pastures from trampling and compaction. When soils are saturated, limit livestock access to pastures; cover animal heavy use areas with rock, hog fuel, and/or geotextile.	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside areas.	Protects pastures from compaction during the winter, improving growth. May improve animal health by covering animal heavy use areas with material so animals are not wading in mud.	Cost of fencing animal heavy use area; cost of feeding hay during the winter; cost of materials for protecting animal heavy use area; may mean landowner will need a Confined Animal Feeding Operation Permit.
d. Site barns and animal heavy use areas away from streams.	Helps prevent sediment, nutrient, and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside areas.	Helps prevent flooding in barns and animal heavy use areas.	Need either off-stream watering facility or other source of water for livestock.
e. Prevent silage leaching and/or store and manage leachate from silage and other vegetative materials.	Helps prevent nutrient runoff into surface water or leaching into groundwater.	Preventing leaching maintains higher nutrient content of ensiled feed material.	May require cost of facility development and purchase of moisture-absorbing materials.
f. Installing gutters and downspouts in areas with high livestock use.	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater.	May improve animal health by lessening mud during the winter, so animals are not wading in mud.	Cost of installation and maintenance of gutters and downspouts.

ED_454-000322884 EPA-6822_012524

Erosion, Sediment, and Mercury Control

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Grazing management: graze pasture plants to appropriate heights, rotate animals between several pastures; provide access to water in each pasture.	Helps prevent sediment, nutrient, mercury, and bacteria runoff into waters of the state. Helps protect streamside areas.	May improve pasture production; easy access to water may increase livestock production as well. May improve composition of pasture plants and help prevent weed problems.	Cost of installing fencing, watering facilities for rotational grazing system; time involved in moving animals through pastures.
b. Farm road construction: construct fords appropriately, install water bars to divert runoff to roadside ditches.	Helps prevent sediment and mercury runoff to waters of the state.	May help prevent water damage on farm roads.	Cost of installation and maintenance.
c. Plant appropriate vegetation along drainage ditches; seed ditches following construction.	Helps prevent sediment and mercury runoff into waters of the state.	May help prevent ditch bank erosion and slumping.	Costs of establishing vegetation.
d. Plant cover crops in orchards or nurseries.	Helps prevent sediment and mercury runoff into waters of the state; helps filter nutrients and slow runoff.	May reduce weed problems in orchards and nurseries; prevents loss of applied fertilizer.	Costs of establishing cover crops; cover crops may compete with primary crop.
e. Irrigate pasture or crops according to soil moisture and plant water needs.	Helps prevent irrigation return flow and associated nutrients, sediment, and mercury to waters of the state.	May reduce costs of irrigation; may help crop or pasture production.	Installation/ maintenance cost. Monitoring time.
f. Install/maintain diversions to prevent unwanted drainage into barnyards and animal heavy use areas.	Helps prevent nutrient and mercury runoff into waters of the state.	Decreases muddiness and shortens saturation period in protected areas.	Cost of installation.

Pest Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply pesticides according to the label. Use the correct rate and	Reduces risk of pesticide runoff to streams or other water resources.	Compliance with Oregon law; reduces health risks to applicator, may	

ED_454-000322884 EPA-6822_012525

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
timing. Comply with label restrictions and precautions.		decrease costs.	
b. Triple rinse pesticide application equipment; dispose of rinse water and containers according to Oregon law. Apply rinsates to sites. Dispose of or recycle clean containers according to Oregon law.	Reduces risk of pesticide runoff to streams.	Compliance with Oregon law. Eliminates disposal costs of collected rinsates identified as hazardous waste.	
c. Calibrate, maintain, and correctly operate application equipment.	Reduces risk of pesticide runoff to streams.	May reduce use and therefore cost of pesticides; reduces health risks to applicator.	Time involved to scout fields is usually offset by reduced or more effective pesticide use.
d. Integrated pest management practices such as pheromone traps, beneficial insect release, and field monitoring. (either in combination with pesticide use or as a replacement to pesticide use)	Reduces risk of pesticide runoff to streams, may reduce loss of non-target species.	May improve effectiveness of pest control system.	
e. Store and mix pesticides on leak-proof facilities.	Reduces risk of pesticide runoff to streams or soil contamination.	Helps protect drinking water; reduces health risks to applicator.	Cost of installation and maintenance.
f. Properly dispose of older unwanted legacy chemicals.	Prevents accidental release of unwanted pesticides into the soils or waterways.	Unwanted chemicals and risk are removed from the producers property.	None if taken to a hazardous waste collection event. These are held periodically in Lane Cty.

Nutrient and Irrigation Efficiencies

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
Apply fertilizer at the correct rate and time applications for crop uptake.	Reduces the risk of excess nitrogen in the soil at the end of the growth season.	Precise application saves the producer money in fertilizer costs.	Time related to precision application.
Sample soil prior to	Prevents the application of	Precise application	Cost of soil sampling and

ED_454-000322884 EPA-6822_012526

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
fertilizer application to know existing nutrients.	excess nutrients.	saves the producer money in fertilizer costs.	analysis.
Plant winter cover crops to take up excess nitrogen left over after crops are harvested.	Takes up extra nitrogen and limits potential for leaching into ground water.	Stores extra nitrogen in plant matter for later release when cover crop is incorporated into the soil.	Cost of seed and fuel to plant cover crop.
Properly maintain irrigation systems to prevent over-irrigation.	Prevents leaching of excess nitrogen past the root zone.	Uniform irrigation application and save producer money on nitrogen costs.	Replacement nozzles at least every four years is recommended.
Monitor soil water content and adjust irrigation schedules to maintain soil water content in an appropriate range in the root zone.	Prevents over- irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Soil monitoring equipment and time to evaluate soil water content.
Schedule irrigation applications based on expected evapotranspiration rates.	Prevents over- irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Time to evaluate expected evapotranspiration rates.

Selker et al, 2004

ED_454-000322884 EPA-6822_012527

ED_454-000322884 EPA-6822_012528

Chapter 3: Goals, Objectives, and Strategies

Mission

The mission of this Area Plan is to develop a framework of strategies for agricultural lands within the McKenzie, Middle Fork, and Coast Fork watersheds (the Management Area) that will contribute to desirable water quality and to develop programs to achieve the goals of the plan while maintaining the economic sustainability of agriculture.

3.1 Goal

Specific goals include:

- Prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Ensure that agricultural activities do not contribute to water pollution or diminished water quality as defined within 303(d) listings and TMDLs.
- Monitor and evaluate the effectiveness of the Area Plan.
- Reduce agriculture's contribution to water quality parameters of concern through education and outreach, and by promoting Optional Management Practices.
- Achieve the following land conditions on agricultural lands throughout the management area that contribute to good water quality.
  - Streamside vegetation provides streambank stability, filtration of overland flow, and moderation of solar heating, consistent with site capability.
  - No visible sediment loss from cropland through precipitation or irrigation induced erosion.
  - No significant bare areas within 50 feet of streams on pasturelands and/or rangelands.
  - Active gullies have healed or do not exist on pasturelands.
  - Livestock manure is stored under cover during the winter and in a location that minimizes risk to surface and groundwater.

Comment [JM2]: Does the LAC want to make the goal the singular statement and move the other goals into the strategy in Section 3.3 below?

3.2 Measurable Objectives

To achieve the Area Plan goal, the following measurable objectives, strategies, milestones, and timelines were developed:

Objectives deemed necessary by the LAC to achieve these goals include:

- Manage sheet and rill erosion to a rate that does not exceed an acceptable level.
- Curb the amount of active streambank erosion.
- Prevent any conditions already prohibited under ORS 468B.025 and 468B.050.
- Manage irrigation surface water return flow to prevent waters of the state from exceeding state water quality standards.
- Improve/maintain the ability of riparian areas to respond and function according to vegetative site capability.
- Provide suggestions of optional measures that could help achieve water quality goals.
- By the 2014 biennial review, a rough assessment of streamside vegetation conditions along agricultural lands in the entire management area will be complete. This assessment can be used to track and report progress in streamside vegetation improvements over time and to identify areas to focus work. Assessment results will be considered at the 2014 biennial review and may be used to revise the goals below.

Comment [JM3]: Please consider whether the Plan objectives are S.M.A.R.T.?

S = specific
M = measurable
A = achievable
R = realistic
T = time bound

For discussion during the LAC meeting:

- Are we achieving the measurable objectives?
- Do you want to change or add objectives?

Comment [JM4]: For example, this objective may have been overly optimistic. An assessment of the Focus Area was completed, but it will take much longer to assess the entire management area.

ED_454-000322884 EPA-6822_012529

- By the 2016 biennial review, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural areas as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as allowing riparian establishment but not at site capability will have reached site capability.
- By the 2014 biennial review, ODA and the LMA will compile information about the location, number, and size of water quality improvement projects completed in the priority area since area plan and rules adoption, as resources and grant program privacy rules allow.
- A small geographic area has been identified within the Management Area, where voluntary outreach and technical assistance work has been focused since 2011 and an initial assessment of streamside conditions was completed. ODA and the LMA will report back to the LAC on the status of land conditions, and outreach and technical assistance efforts in the area, at the 2014 biennial review.
- By the 2014 biennial review (or other appropriate date), the Local Management Agency will have offered technical assistance to all landowners in the area with lands where agricultural activities appear to prevent streamside vegetation from establishing. By the 2014 biennial review, the LMA will report back to the LAC and ODA on the amount of lands where landowners accept voluntary assistance to allow streamside vegetation to establish and develop.
- By the 2014 biennial review (or other appropriate date), ODA and/or the LMA will complete a follow-up assessment in the area and evaluate land condition changes over the two-year period.

Please consult Section 3.3 for more detailed strategies identified by the LAC to achieve the mission, goals, and objectives.

3.2.1 Milestones (Targets) and Timelines

The following milestones and timelines were developed in cooperation with ODA, DEQ, the LAC, and the SWCDs. Focus Area Action Plans are developed as a tool with milestones and timelines for implementation of the Area Plan within a defined geographic area.

A description of how the Management Area will be assessed and the timeframe for assessment must be included. If the LAC is not immediately receptive, talk with Mike and John about how to work with the LAC over the next biennium. This section is a continuing project.

3.2.2 Focus Area

Priority Areas: Strategic Implementation of the Area Plan

Comment [JM5]: Now that we commonly refer to these areas as Focus Areas, would it be alright to change the word "Priority" to "Focus" throughout?

Beginning in April 2010, ODA, the LMA, the LAC, and other partners began work to identify Priority Areas within the Management Area. At the 2010 biennial review, the LAC expressed the importance of areas for focused work being identified through a strategic approach. Partners evaluated 6th field watersheds within the Management Area based on existing water quality issues, agriculture's effect on water quality, existing work and partner relationships within the watershed, and identification of the watershed as an existing priority by partners. Through this process, ten 6th field watersheds were

ED_454-000322884 EPA-6822_012530

identified for additional evaluation. The number of tax lots, land use, agricultural activities, and identified water quality issues were considered.

Outreach and technical assistance will be focused in these areas, and every landowner with potential land condition concerns will be contacted with an offer of voluntary assistance. ODA, the LMA, and the LAC will measure, evaluate, and document the effectiveness of the Area Plan by assessing changes in land conditions in the current area of focus during the biennial review of the Area Plan. During each biennial review, the partners will also assess the timeline and sequence for working in the initial priority area and in future priority areas.

Gettings Creek Watershed: First Area of Focus

Gettings Creek is a small perennial stream that is a tributary to the Coast Fork Willamette. The Gettings Creek watershed is located on the east side of I-5, just north of Cottage Grove. The watershed is approximately 10,000 acres (60% forest, 20% rural residential, and 20% agricultural). Agriculture in the watershed is mainly cattle and small acreage livestock owners. Parameters of concern identified for the Gettings Creek Watershed were temperature and *E. coli*. Evaluation will be conducted using riparian vegetation as a surrogate for temperature and presence of livestock and proximity to seasonal or perennial streams as an initial surrogate for *E. coli*.

In 2011, ODA evaluated the current condition of streamside vegetation for the Gettings Creek Watershed, using satellite images, and produced a preliminary baseline map that shows streamside conditions before delivery of technical assistance in the area of focus. The preliminary baseline assessment estimates the percent of agricultural streamsides that fall into the three streamside vegetation classes, shown in Table X.

Table 8. Feet of Streamside in Each Vegetation Class for Gettings Creek (Baseline-2011)

Streamside Vegetation Class	Gettings Creek
I - Streamsides have site-capable vegetation	8,130 feet
II - Streamsides allow streamside vegetation to establish, but the vegetation has not reached site-capable conditions	N/A
III - Agricultural activities may prevent establishment of streamside vegetation	44,725 feet

In 2011, ODA worked with the Upper Willamette SWCD developed an action plan for implementing technical assistance in the priority area. The Action Plan identifies goals (by July 2013) of 1) increasing percent site capable vegetation in riparian areas adjacent to agricultural land by 20 percent and 2) decreasing the number of landowners feeding livestock within the active floodplain by 25 percent.

In late 2011, the Upper Willamette SWCD contacted all agricultural landowners to offer technical assistance. In addition to the initial contact, the Upper Willamette SWCD invited all landowners to a workshop that was held December 15, 2011. The SWCD has also begun targeted outreach to Class III landowners. After implementing projects in the focus area, an updated map will be produced to show the new conditions. The Upper Willamette SWCD will report on progress by comparing the baseline and post-implementation percent of streamside areas in each of the three-streamside vegetation classes.

Future Priority Areas

Future priority areas are 6th field HUCs with agricultural land uses in the Management Area. ODA, the LAC, the LMA, and other partners will work together to determine the order of future priority areas, based on condition of streamside vegetation and existing contacts and relationships.

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For more information and background on the Priority Area Process, see Section 4.3 below. Results of the assessments and targeted assistance are reported to the LAC at the Biennial Review and are summarized in Chapter 4. The Focus Area Action Plan is provided in Appendix K.

3.3 Strategies for Area Plan Implementation

The LAC recommends that the ODA, the Upper Willamette SWCD, Watershed Councils, Oregon State University Extension, and other partners use the following strategies to help achieve the goals and objectives of this Area Plan.

To protect or improve water quality, an effective strategy must increase awareness of the problems and the range of potential solutions, motivate appropriate voluntary action, and provide for technical and financial assistance to plan and implement effective water pollution prevention and control measures. The SWCDs and other partners will cooperate to implement the following strategies at the local level with landowners:

- Prevent runoff of agricultural wastes: agricultural activities will not discharge any wastes or place waste where it is likely to run off into waters of the state.
- Prevent and control upland and cropland soil erosion using practical and available methods.
- Control active channel erosion to protect against sediment delivery to streams.
- Prevent bare areas due to livestock overgrazing near streams.
- Establish streamside vegetation along streams on agricultural properties to provide streambank stability, filtration of overland flow, and moderation of solar heating.

Comment [JM6]: The "Track Changes" edits are suggestions only.

Does the LAC want to include any of this writing? Does the LAC want to move the list of "goals" to this section?

3.3.1 Education and Outreach

- Hold workshops on water quality issues and the conservation practices that will help improve water quality.
- Develop demonstration projects to showcase successful conservation practices and systems.
- Submit news articles and public service announcements to area newspapers, radio stations, and newsletters.
- Integrate training about the agricultural water quality program with pesticide applicator training credit hours.
- Share education materials with agribusiness field representatives, farm stores, and others having regular contact with agricultural producers.
- Develop a repository for educational and technical materials that is accessible to the public and maintained with current information. Agencies, agribusinesses, and other organizations may then refer landowners to the repository for more information. The LAC recommends that the Upper Willamette SWCD, as the Local Management Agency, serve as the repository for this information, and that as much of this information as possible be maintained on or linked to the Upper Willamette SWCD and ODA websites.

As resources allow, the SWCDs, in partnership with other agencies and local organizations, will develop educational programs to improve the awareness and understanding of agricultural water quality issues. They will strive to provide the most current information in a manner that avoids conflict and encourages cooperative efforts to solve problems. Implementation of the Area Plan is a priority element in the SWCD's Annual Work Plan and Long-Range Business Plan.

The following elements are part of an effective educational program:

- Develop an outreach strategy.

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- Showcase successful projects and systems by conducting tours for landowners and media.
- Recognize successful projects and systems through appropriate media and newsletters.
- Promote cooperative on-the-ground projects to solve critical problems identified by landowners/operators and in cooperation with partner organizations.
- Conduct educational programs to promote public awareness of agricultural water quality.
- Evaluate current research and scientifically valid monitoring results.

Note: we're missing formal evaluation of E&O. Do we have any ideas for this?

Comment [JM7]: The "Track Chanages" edits are suggestions only. Does the LAC want to modify the current Plan to include any of these?

3.3.2 Technical Assistance

Provide technical assistance to landowners in the Management Area to help them comply with the Area Rules and develop and meet their conservation and production goals.

3.3.3 Priority Area Work

Identify and focus outreach and technical assistance work in small geographic areas to help demonstrate the rate of change in land conditions that are protective of water quality.

- Identify water quality parameter(s) of concern and a possible land condition surrogate (e.g. streamside vegetation as a surrogate for temperature).
- Compile and map available baseline land condition and water quality data.
- Conduct outreach to promote awareness of water quality issues and their solutions.
- Conduct systematic outreach to meet with landowners, assess land conditions, and offer voluntary technical assistance.
- Seek to secure necessary resources to help landowners achieve land conditions that contribute to good water quality.
- Map land conditions after two years of implementation and quantify changes from the baseline.
- Compile updated available water quality data and provide to ODA for the purpose of quantifying changes from the baseline.
- Evaluate and discuss program effectiveness at the next biennial review of the Area Plan.

3.3.4 Incentives for Voluntary Work

- Submit grant proposals to the Environmental Protection Agency, Oregon Watershed Enhancement Board, U.S. Department of Agriculture, DEQ, ODA and other organizations, that will support the adoption of voluntary conservation actions to achieve the goals and objectives of the Area Plan.
- Promote incentive-based cost-share programs to assist landowners with implementing voluntary conservation projects.

Effective water quality management depends on activities and structural measures that are the most effective, practical means of controlling and preventing pollution from agricultural activities. Appropriate management activities for individual farms may vary with the specific cropping, topographical, environmental, and economic conditions at a given site. Due to these variables, it is difficult to recommend any specific, uniform set of management activities in this document to improve agricultural water quality.

Comment [JM8]: The "Track Changes" section below is suggestion only.

Does the LAC want to include any of this writing in the Plan?

Management activities and land management changes are most effective when selected and installed as parts of a comprehensive resource management plan based on natural resource inventories and assessment of management activities.

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A detailed list of specific measures that can be used to address agricultural pollution are contained in other documents such as the NRCS Field Office Technical Guide, available for reference at the local NRCS office. Landowners and operators have flexibility in choosing management approaches to address water quality issues on their lands.

Voluntary conservation plans describe the management systems and schedule of conservation activities that the landowner will use to conserve soil, water, and related plant and animal resources on all or part of a farm unit. Landowners, operators, consultants, or technicians available through a SWCD or the NRCS may develop voluntary conservation plans. A conservation plan can be used to outline specific measures necessary to address the "Prevention and Control Measures" outlined in this Area Plan.

Conservation activities should:

- Identify priorities for management activities, including reasonable timelines.
- Control pollution as close to the source as possible.
- Improve irrigation water use and conveyance efficiency to reduce the potential of polluted return flows.
- Show reduction in potential sources of pollution through scientifically valid monitoring and periodic surveys of stream reaches and associated lands.
- Be flexible to adjust management based on feedback, or monitoring and changing environmental and economic conditions.

For a list of agencies and organizations to contact for more information about resource management, please refer to Appendix B: Educational and Technical Services for Natural Resource and Farm Management.

3.3.5 Funding

Comment [JM9]: Does the LAC want to include Section 3.3.5 regarding funding?

Sometimes the cost of conservation measures do not fit well with a producer's operating budget. Local, state, and federal technical and financial resources are available to improve the cost-effectiveness of protecting and improving water quality. It is not the intent of the Area Plan to impose a financial hardship on any individual. If there are potential water quality threats on their land, it is the responsibility of the landowner or operator to request technical and/or financial assistance and to develop a reasonable time frame for addressing potential water quality problems.

As resources allow, the SWCD, NRCS, and other natural resource agency staff is available to help landowners evaluate approaches for reducing runoff and soil erosion on their farms and incorporate these into voluntary conservation or water quality plans. Personnel in these offices can also design and assist with project implementation, and help identify sources of cost sharing or grant funding.

Technical and financial assistance may be available through current USDA conservation programs. Other programs that stand ready to partner for conservation include the U.S. EPA's nonpoint source implementation grants ("319 funds"), or state programs such as the OWEB grant programs, the Riparian Tax Incentive Program, and the Wildlife Habitat Conservation and Management Program.

The SWCDs will seek funding to implement the Area Plan. Funding is necessary in four main areas:

- Education: to fund workshops, tours, and development of published materials.
- Technical assistance: to hire staff to work with landowners to develop and implement solutions to agricultural water quality concerns.
- Financial assistance: to provide cost-share dollars to assist landowners to implement agricultural water quality conservation activities.

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- Monitoring: to monitor land conditions and water quality and evaluate how agricultural activities are impacting streams in the Management Area.

For sources of financial assistance, see Appendix F: Conservation Funding Programs.

3.3.6 Monitoring and Evaluation

The LAC recommends that the ODA, the Upper Willamette SWCD, and other partners submit grant proposals that support monitoring. Inventory and monitoring projects should answer the following questions:

- What are baseline levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in mainstems and tributaries of the McKenzie, Middle Fork and Coast Fork?
- What are the trends in levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in the same waterbodies?
- What are baseline summer temperature levels in mainstems and tributaries of the McKenzie, Middle Fork, and Coast Fork? What are temperature trends in the same waterbodies?
- What are sources of pollution that are impacting parameters of concern in the McKenzie, Middle Fork, and Coast Fork?
- Are particular conditions of concern actually impacting water quality in adjacent waterbodies?
- By what mechanism and to what extent do particular agricultural practices improve or degrade water quality?
- How much agricultural land is known through scientifically verifiable means to be out of compliance with the Area Rules?

For a description of monitoring and evaluation activities, see Chapter 4.

3.3.7 Safe Harbor

The LAC recommends that the ODA provide a program that protects operators if they seek technical assistance prior to any complaint, similar to programs offered by the Occupational Health and Safety Division. Landowners or operators should be required to be diligent in their efforts. The protection would pertain to administrative enforcement actions.

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Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Implementation and Accomplishments

Many conservation activities and implementation monitoring tracks have been implemented to benefit water quality. The SWCD and NRCS track activities that have been implemented through quarterly reports to ODA and through a NRCS database, respectively. Projects that have received funding from OWEB are tracked in OWEB's restoration database. In addition, partner agencies can submit reports of projects and activities in the Management Area that improve water quality.

Include the detailed accomplishments table here.

Comment [JM10]: Would the District please provide an updated accomplishments table?

4.2 Water Quality Monitoring—Status and Trends

Comment [JM11]: With District, DEQ, watershed council and other monitoring, I'd like to prepare an update for the LAC ahead of their meeting to include in this section.

This is the appropriate location to include the monitoring summary table if it is filled out.

Ambient site and Oregon Water Quality Index data review, plus any additional information from SWCDs, Watershed Council, and other partners also goes here.

Statewide monitoring and evaluation of water quality and streamside conditions on agricultural lands

ODA conducts monitoring at a statewide level and analyzes other agencies' and organizations' monitoring data to answer several monitoring questions related to agriculture and water quality.

- What are current water quality and landscape conditions in agricultural areas in Oregon?
- What are water quality trends?
- How well does the existing monitoring network assess agricultural water quality trends and streamside conditions in Oregon?
- What are riparian vegetation trends along agricultural lands in Oregon?
- How do riparian conditions compare with site capabilities?
- How do riparian vegetation conditions change in aerial photos of selected stream reaches?
- How do changes in riparian vegetation condition compare with trends in water quality in monitored watersheds?

To answer these questions, ODA evaluates water quality data from existing sites in DEQ's LASAR database (http://deq12.deq.state.or.us/lasar2) that reflects agricultural influence on water quality. In 2011, ODA received funding from the Oregon Legislature to fund water quality sampling at 19 additional sites around Oregon. These data, once sampling begins, will also be published in the LASAR database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide.

For each Management Area, ODA currently evaluates other agencies' and organizations' water quality data to answer the following questions.

- What water quality and land condition data from agricultural watersheds are available?
- What are trends in available water quality and land condition data in agricultural watersheds since Area Plan and Rule adoption, and since the last biennial review?

Data are reviewed every two years and summarized to the LACs and LMA during the biennial review process. Data summaries are also added to the Water Quality Issues section of the plan.

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The Oregon Department of Environmental Quality maintains several long-term water quality monitoring sites in the management area. These include the Coast Fork Willamette at Mt. Pisgah Park, the McKenzie River at Coburg Road, the Willamette River at Highway 126 in Springfield, the Middle Fork Willamette at Jasper Bridge, the McKenzie River at Hendricks Bridge, and the McKenzie River at McKenzie Bridge. Of these sites, ODA considers the Coast Fork Willamette at Mt. Pisgah Park and Willamette River at Highway 26 to reflect predominantly agricultural influence. While agricultural activities also influence water quality at the other sites, it is difficult to separate the agricultural influences from urban and other influences.

In January 2012, the Oregon DEQ published the Oregon Water Quality Index Summary Report. The Oregon Department of Environmental Quality uses the Oregon Water Quality Index to characterize water quality at its long-term monitoring sites for the 2001-2010 water years. The index analyzes water quality variables and produces a score describing general water quality. The index is unitless, with scores ranging from 10 (very poor) to 100 (excellent).

Out of the six DEQ sites in the management area, five sites, including the Willamette River at Highway 126 site, received scores ranging from 91 to 93, which are classified as excellent. The Coast Fork Willamette at Mt. Pisgah Park received a score of 88, which is considered good. Water quality at the two agriculturally influenced sites did not significantly improve or worsen over the 10-year period.

ODA received funding during the 2011 legislative session to add agricultural sites to DEQ's monitoring network, and is contracting with DEQ to conduct that sampling. One of the new sites is located on the Mohawk River. Data collection at this site began in early 2012, and data from this site will be included in the water quality data summary during the next biennial review.

The United States Geological Survey (USGS) and the Eugene Water and Electric Board (EWEB) have done some testing in the Management Area for pesticides and other industrial chemicals and their by-products. These monitoring efforts focus on collecting water samples during storm runoff from various land use types (forestry, urban, agriculture) to evaluate the mobilization of pollutants during major precipitation events. Unfortunately, the sampling has been unable to isolate the influence from agricultural areas. The sites that have been used to sample for agricultural use also tend to have influence from residential and forest areas. EWEB is planning to continue conducting monitoring in an attempt to isolate the influence from agriculture. Many of these products are relatively soluble in water, while others attach strongly to soil particles. They are transported from the land surface to streams through a combination of subsurface drainage, surface runoff, and soil erosion. Infiltration of rain and irrigation water facilitate transport to groundwater (United States Geological Survey, 1998)

The Eugene Water and Electric Board conducted a "Nonpoint Source Pollution Assessment and Evaluation" in 2004 and 2005. This project attempted to evaluate nonpoint pollution sources, including agriculture, forestry, septic systems, and construction activities. The main objective was to bring watershed landowners, agencies, businesses, and other stakeholders together to discuss these issues and attempt to reduce the threats of non-point pollution from these activities.

The main objectives of the agricultural assessment were to develop an inventory of agricultural activities, determine high priority areas, and to identify problems through water quality monitoring. The majority of the evaluation work was conducted using geographic information systems (GIS). Agricultural fields were digitized in GIS using aerial photography and then ground-truthed to enhance the accuracy of the crop data. Chemical applications were estimated using application rates and acreages of each crop. Based on this analysis, it was determined that over 8,000 lbs. of chemical active ingredients are applied in the McKenzie Basin annually. The GIS analysis also identified two priority areas with a higher potential of pesticide run-off. The first area is land near the confluence of Cedar Creek and the McKenzie River and

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the second area is between EWEB's Walterville Power Canal and the McKenzie River. These are two areas with more intensive agricultural practices. Hazelnuts, nursery operations, blueberries, and vegetable crops were identified as the four highest chemical usage crops in the area. The overall results of the water quality monitoring indicate no major impacts from nonpoint sources of pollution in the area (Morgenstern, 2006).

The Eugene Water and Electric Board conducted water quality monitoring at 13 sites in the McKenzie River between 2000 and 2009. Sites in Camp Creek, Cedar Creek, the Mohawk River, and the lower McKenzie River had the most agricultural land within the watershed. Monitoring data showed excellent water quality in the McKenzie River. However, some potential water quality concerns were also identified in tributaries in the lower watershed. Camp Creek, Cedar Creek, and Keizer Slough (which is not agriculturally influenced) showed the highest concentrations of nitrates, total phosphorus, metals, *E. coli*, total organic carbon, total suspended solids, total coliform and specific conductance. Nitrate levels in Camp Creek declined over the duration of the monitoring period. Camp Creek, Cedar Creek, and the lower Mohawk River had the highest levels of *E. coli*, which sometimes violated Oregon's water quality standards.

Between 2008 and 2010, the Middle Fork, Coast Fork, and Long Tom watershed councils collaborated to evaluate water quality above and below eight small communities in Lane County. Some of the monitoring data were gathered in streams with significant agricultural influence. Monitoring results relevant to agriculture are summarized below.

In the Middle Fork Willamette, upstream and downstream samples were collected on Lost Creek and Little Fall Creek. Both of these watersheds include some agricultural land, as well as residential and forest lands. Lost Creek data showed temperature and dissolved oxygen concerns during the monitoring period, with relatively infrequent bacteria concerns at the downstream site. Little Fall Creek showed temperature and dissolved oxygen concerns, but met state bacteria standards consistently.

In the Coast Fork Willamette, Hill Creek, Camas Swale, Gettings Creek, and Mosby Creek were the streams monitored that have significant agricultural land. Gettings Creek had greater water quality concerns than the other streams in the study, with temperature and bacteria concerns at the lower site and an increase in water quality concerns between the upstream and downstream sites.

4.3 Progress Toward Measurable Objectives

This may include a Management Area and Focus Area discussion.

Comment [JM12]: Would the District provide an update to the progress report for the Management and Focus Areas?

Land Condition Assessment

ODA will work with LMAs and other partners to design and conduct an assessment of streamside areas along agricultural lands in the management area prior to the next biennial review. These assessments will allow ODA and partners to track improvements in land conditions over time. Often, improvements in land conditions are detectable much earlier than changes in water quality. For example, when a landowner restores a streamside area, land conditions improve rapidly, even though it may take 20 years for streamside vegetation to reach the height that it can positively affect stream temperatures.

Implementation Activities Assessment

In addition, during the biennial review process, ODA, the LMA, and the LAC assess activities that have occurred to help achieve plan goals and objectives, including the following.

ED_454-000322884 EPA-6822_012538

- Outreach and education activities conducted to promote awareness of water quality issues and encourage agricultural land conditions that protect water quality, and the level of participation in these activities.
- Voluntary conservation projects installed by agricultural landowners and managers in cooperation with the LMA and other agencies and organizations.
- Number of complaint investigations, the result of each complaint investigation, and corrections of violations.

Area Plan and Rules Effectiveness Evaluation

The LAC, ODA, and the LMA will evaluate the effectiveness of the Area Plan in improving water quality and land conditions, include the evaluation results in the next update of the Area Plan, and summarize the results in a biennial report to the Oregon Board of Agriculture. ODA, the LMA, and the LAC will discuss the monitoring and evaluation results at the next biennial review, what these results mean in terms of Area Plan effectiveness, and modifications to the Area Plan and Rules. Some of the questions to consider in the discussions include:

- Are all of our goals and objectives measurable?
- Were the activities that we committed to do over the previous two years in our goals, objectives, and strategies accomplished?
- Were all violations that were found during investigations resolved or are they in the process of being resolved?
- Were our goals and objectives for land condition improvements met?
- Are water quality data from agricultural lands showing improvement?
- How do water quality and land condition data trends compare? Do we need to start collecting other kinds of land condition data?

Documenting Effectiveness Using Priority Areas

Why Focus Efforts in a Priority Area?

The Oregon Agricultural Water Quality Program relies primarily on voluntary improvements in land conditions for agriculture to fulfill its responsibility to prevent and control water pollution. One way to implement an Area Plan systematically is to focus and measure implementation in relatively small regions within the Management Area.

The priority area concept evolved from conversations between ODA, LMAs, LACs, and other stakeholders and partners seeking better ways to implement the Agricultural Water Quality Program and Area Plans. ODA and program partners believe that strategic, focused, and systematic delivery of outreach and technical assistance will lead to more measurable levels of implementation and allow ODA and the LMA to make better use of limited resources.

While the priority area approach is relatively new for ODA, the LMA, and the LAC, it is consistent with other agencies' and organizations' efforts to work proactively in targeted geographic areas.

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Selecting A Priority Area

A priority area is usually a small watershed (6th or 7th field HUC) with agricultural lands. An initial priority area is selected jointly by ODA, the LMA, the LAC, and other partners, based on one or more of the following factors:

- Significant water quality concerns probably associated with agricultural activities.
- LMA and other partners are already working with landowners in an area.
- Size of the area matches the LMA's capacity to work in the entire area in a relatively short time frame.

During the 2012 biennial review process, ODA, the LMA, and the LAC discussed the priority area concept, an initial priority area, future priority areas, measurable objectives for implementation in the priority area, and timelines for implementation. The initial and future priority areas for the Management Area are described in the Strategies section of this Area Plan.

Land Condition and Water Quality

Once a priority area is selected, land condition measures are identified for which baseline and post-implementation data will be collected and mapped. These land condition measures serve as surrogates for the water quality parameters of concern in the priority area. For example, streamside vegetation is generally used as a surrogate for water temperature, sediment may be used as a surrogate for pesticides and mercury, and livestock access to waterways could be used as a surrogate for bacteria. Water quality monitoring data may also help partners evaluate the effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides, to evaluate progress in the priority area and to help identify future priority areas.

The Oregon Agricultural Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over land conditions.
- It can be difficult to separate agriculture's influence on water quality data from other influences, such as bacteria from failing septic systems, wildlife, and recreation.
- Other factors such as climate change may have long-term impacts on water quality that are beyond agriculture's control.
- It is expensive to monitor water quality at the scale needed to evaluate effectiveness.
- Changes in land conditions, such as streamside vegetation, will take a long time to translate into water quality improvements.

Focused Outreach and Technical Assistance

After baseline streamside conditions are mapped, the LMA and other interested partners deliver focused and systematic outreach and technical assistance to landowners in the priority area. Every landowner with potential land condition concerns is contacted with an offer of voluntary assistance. Focused, one-on-one (active) outreach and technical assistance efforts are often more effective in reaching landowners than general (passive) outreach. This focused program delivery will allow ODA, the LMA, and the LAC to implement the Area Plan systematically by moving focused work from one small watershed to the next over time, eventually reaching the entire Management Area.

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Monitoring and Evaluation

ODA, the LMA, and the LAC will evaluate and document the implementation of the Area Plan by assessing improvement of land conditions in the priority area during each biennial review. Comparisons of baseline and post-implementation land conditions (along with available water quality data) will allow these partners to determine whether the selected land condition measures have improved. These partners and other stakeholders will also be able to evaluate the status and trends of Area Plan implementation more readily than from reports of implementation efforts scattered throughout a Management Area.

The priority area process will help ODA, the LMA, the LAC, and other program partners to evaluate whether implementation of the Agricultural Water Quality Program is achieving the measurable objectives in the Area Plan, such as:

- Achieve X% compliance with the Area Rules over Z years
- Achieve Y% water-quality protective vegetation over Z years

Stream Temperature and Streamside Vegetation

Across Oregon's 38 Water Quality Management Areas, many LMAs are focusing their initial priority area implementation on streamside vegetation. There are several reasons for this focus:

- Streamside vegetation improves water quality for multiple parameters, including temperature, sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation is visible from public roads and on aerial photos, allowing agencies, stakeholders, and the general public to see that agriculture is part of the solution.
- Landowners can take steps to improve streamside vegetation, with or without assistance from the LMA, watershed councils, or other local partners.
- Streamside vegetation improves fish and wildlife habitat.

The Oregon Agricultural Water Quality Program usually uses the concept of "site-capable streamside vegetation" to describe the vegetation that agricultural streamsides need in order to prevent and control water pollution. Site-capable streamside vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g. elevation, soils, climate, wildlife, fire, floods) and historical and current human influences (e.g. channelization, roads, invasive species, land management). Site-capable streamside vegetation can be determined for a specific site based on: streamside vegetation at the site (type, location, and size), streamside vegetation at nearby reference sites (with similar natural characteristics), or NRCS soil surveys (which often describe the vegetation in uncultivated areas).

Mature, site-capable streamside vegetation usually provides three functions that help to prevent or control water pollution from agricultural activities:

1. Shade that blocks direct solar radiation and moderates stream temperatures.
2. Bank stability and reduction of streambank erosion.
3. Filtration of pollutants (e.g. bacteria, nutrients, pesticides, mercury, sediment) from overland flows.

However, in some cases mature site-capable vegetation may not be needed to provide these functions, or may not provide these functions. For example:

- Mature trees may not be necessary to protect water quality; willows or other shrubs may suffice on small streams.
- Mature conifers may shade crops or create undesirable microclimates; mature alders may be an adequate alternative.

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- Mature juniper is site-capable vegetation in central and eastern Oregon, but it reduces bank stability and increases erosion.
- Invasive grasses (such as reed canary grass or Kentucky bluegrass) can be the dominant site-capable vegetation along streams, but they generally do not provide all of the required water quality functions.
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality.

To measure baseline conditions in the priority area, the LMA will map streamside areas on agricultural lands and estimate the percentage of streamside areas that fall into four categories, referred to as Class I, II, III, and IV in this Area Plan (Table 2).

Table 9. Classes of Streamside Vegetation for Assessing Land Conditions.

Class	Water-Quality Protective Vegetation	Agricultural Impacts	Three Functions Provided
I	Present	None	All three
II	Establishing and growing	None	Depends on size / location / density of vegetation
III	Unable to establish	Prevent vegetation from establishing	No
IV	Unable to establish	None – non ag factors prevent vegetation from establishing	No

Every two years, ODA, the LMA, and the LAC will evaluate the progress of Area Plan implementation in the priority area. The percentage of streamside areas that fall into the four classes will be updated. Streamside areas can be reclassified from Class III to Class II where projects remove agricultural impacts and allow streamside vegetation to establish. Reclassification from Class II to Class I will usually take longer than two years, because streamside vegetation needs to grow to a height where it can provide shade and other functions.

Placeholder - Source assessment/discussion
What are the ag sources that are contributing to the status and trends that we observe? Should we at least revisit that section of the plan, given the data? Is there a way to make those sections more specific, either geographically or by activity? For example, is winter feeding more of a contributor? Do existing data support the assumptions that the plan has already made about agricultural sources? What data are needed to further assess the relative importance and geographic distribution of the sources?

Placeholder - What do water quality and land condition data tell us about where work should be focused and what issues work should focus on?

- Summarize source/priority identification data collected by watershed councils, SWCDs, DEQ, etc.
- If DEQ, watershed council, or other data indicate water quality problems, what are the potential agricultural sources of these problems?
- What types of objectives and strategies should we identify for the next two years to address the agricultural sources of those problems?

Is additional water quality or landscape monitoring needed to identify areas where focused work is needed?

ED_454-000322884 EPA-6822_012542

4.4 Aerial Photo Monitoring of Streamside Vegetation

Put results here.

Comment [JM13]: Paul, do you have an update for this section?

4.5 Biennial Reviews and Adaptive Management

A summary of the biennial review and resulting recommendations goes here.

Comment [JM14]: This section will be updated to reflect the LAC's discussion and recommendations.

Topics for discussion during the biennial review may include the following:

1) *Land condition and water quality monitoring:*
   - *Status and trends in agricultural land conditions.*
   - *Status and trends in water quality data for agricultural areas.*
   - *Comparison of trends in land condition with trends in water quality.*
   - *Addressing gaps in the existing land condition or water quality monitoring network.*
2) *Area Plan changes:*
   - *New point- nonpoint-source programs. (We regulate point sources too, e.g., horse facilities that CAFO elects not to permit.)*
   - *Rule changes.*
   - *Improvements needed to meet water quality standards.*
3) *Area Plan implementation progress and effectiveness:*
   - *Progress toward meeting goal(s) and measurable objectives.*
   - *Implementation of specific conservation strategies and appropriate best management practices for source control.*
   - *Effectiveness of voluntary actions (through outreach, education, landowner contacts, and technical and financial assistance) in addressing water quality concerns. Note: we still need a way to measure the effectiveness of our voluntary actions.*
   - *Data gaps.*
4) *Regulations:*
   - *Number and nature of compliance cases.*
   - *Outcome or resolution of compliance cases.*
   - *Effectiveness of regulatory actions in addressing water quality concerns.*
5) *Outreach:*
   - *Events held.*
   - *Number of landowners.*
   - *Number of site visits of projects.*

ED_454-000322884 EPA-6822_012543

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ED_454-000322884 EPA-6822_012545

Appendices

Common Agricultural Water Quality Parameters of Concern

Sources of Information and Technical Assistance

2010 Water Quality Assessment List and Decision Matrix

Water Quality Parameters List and Affected Beneficial Uses

Pesticide Use in Oregon

Conservation Funding Programs

Revised Universal Soil Loss Equation (RUSLE)

ORS 468B.025 and 468B.050

References on Water Quality Improvement Practices for Agricultural Landowners

Where Does the 25-year Storm Event Requirement come from in the Riparian Characteristic to Achieve?

Gettings Creek Focus Area Action Plan

ED_454-000322884 EPA-6822_012546

ED_454-000322884 EPA-6822_012547

Appendix A: Common Agricultural Water Quality Parameters of Concern

The following parameters are used by DEQ in establishing the 303(d) List and assessing and documenting waterbodies with TMDLs. Note: This is an abbreviated summary and does not contain all parameters or detailed descriptions of the parameters and associated standards. Specific information about these parameters and standards can be found at: www.deq.state.or.us/wq/assessment/assessment.htm or by calling (503) 229-6099.

Parameters

Template Language

Descriptions of Common Agricultural Parameters of Concern: This language can be used or added to existing language.

Bacteria: *Escherichia coli (E. coli)* is measured in streams to determine the risk of infection and disease to people. Bacteria sources include humans (recreation or failing septic systems), wildlife, and agriculture. On agricultural lands, E. coli generally comes from livestock waste, which is deposited directly into waterways or carried to waterways by livestock via runoff and soil erosion. Runoff and soil erosion from agricultural lands can also carry bacteria from other sources.

Biological Criteria: To assess a stream's ecological health, the community of benthic macro invertebrates is sampled and compared to a reference community (community of organisms expected to be present in a healthy stream). If there is a significant difference, the stream is listed as water quality limited. These organisms are important as the basis of the food chain and are very sensitive to changes in water quality. This designation does not always identify the specific limiting factor (e.g., sediment, nutrients, or temperature).

Dissolved Oxygen: Dissolved oxygen criteria depends on a waterbody's designation as fish spawning habitat. Streams designated as salmon rearing and migration are assumed to have resident trout spawning from January 1 – May 15, and those streams designated core cold water are assumed to have resident trout spawning January 1 – June 15. During non-spawning periods, the dissolved oxygen criteria depends on a stream's designation as providing for cold, cool or warm water aquatic life, each defined in OAR 340 Division 41.

Harmful Algal Blooms: Some species of algae, such as cyanobacteria or blue-green algae, can produce toxins or poisons that can cause serious illness or death in pets, livestock, wildlife, and humans. As a result, they are classified as Harmful Algae Blooms. Several beneficial uses are affected by Harmful Algae Blooms: aesthetics, livestock watering, fishing, water contact recreation, and drinking water supply. The Public Health Department of the Oregon Health Authority is the agency responsible for posting warnings and educating the public about Harmful Algae Blooms. Under this program, a variety of partners share information, coordinate efforts and communicate with the public. Once a water body is identified as having a harmful algal bloom, DEQ is responsible for investigating the causes, identifying sources of pollution and writing a pollution reduction plan.

Mercury: Mercury occurs naturally and is used in many products. It enters the environment through human activities and from volcanoes, and can be carried long distances by atmospheric air currents. Mercury passes through the food chain readily, and has significant public health and wildlife impacts from consumption of contaminated fish. Mercury in water comes from erosion of soil that carries

ED_454-000322884 EPA-6822_012548

naturally occurring mercury (including erosion from agricultural lands and streambanks) and from deposition on land or water from local or global atmospheric sources. Mercury bio-accumulates in fish, and if ingested can cause health problems.

Nitrate: While nitrate occurs naturally, the use of synthetic and natural fertilizers can increase nitrate in drinking water (ground and surface water). Applied nitrate that is not taken up by plants is readily carried by runoff to streams or infiltrate to ground water. High nitrate levels in drinking water cause a range of human health problems, particularly with infants, the elderly, and pregnant and nursing women.

Pesticides: Agricultural pesticides of concern include substances in current use and substances no longer in use but persist in the environment. Additional agricultural pesticides without established standards have also been detected. On agricultural lands, sediment from soil erosion can carry these pesticides to water. Current use agricultural pesticide applications, mixing-loading, and disposal activities may also contribute to pesticide detections in surface water. For more information, see: www.deq.state.or.us/wq/standards/toxics.htm.

Phosphorous/Algae/pH/Chlorophyll a: Excessive algal growth can contribute to high pH and low dissolved oxygen. Native fish need dissolved oxygen for successful spawning and moderate pH levels to support physiological processes. Excessive algal growth can also lead to reduced water clarity, aesthetic impairment, and restrictions on water contact recreation. Warm water temperatures, sunlight, high levels of phosphorus, and low flows encourage excessive algal growth. Agricultural activities can contribute to all of these conditions.

Sediment and Turbidity: Sediment includes fine silt and organic particles suspended in water, settled particles, and larger gravel and boulders that move at high flows. Turbidity is a measure of the lack of clarity of water. Sediment movement and deposition is a natural process, but high levels of sediment can degrade fish habitat by filling pools, creating a wider and shallower channel, and covering spawning gravels. Suspended sediment or turbidity in the water can physically damage fish and other aquatic life, modify behavior, and increase temperature by absorbing incoming solar radiation. Sediment comes from erosion of streambanks and streambeds, agricultural land, forestland, roads, and developed areas. Sediment particles can transport other pollutants, including bacteria, nutrients, pesticides, and toxic substances.

Temperature: Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Several temperature criteria have been established to protect various life stages and fish species. Many conditions contribute to elevated stream temperatures. On agricultural lands, inadequate streamside vegetation, irrigation water withdrawals, warm irrigation water return flows, farm ponds, and land management that leads to widened stream channels contribute to elevated stream temperatures. Elevated stream temperatures also contribute to excessive algal growth, which leads to low dissolved oxygen levels and high pH levels.

ED_454-000322884 EPA-6822_012549

Appendix B: Sources of Information and Technical Assistance

Upper Willamette Soil and Water Conservation District (Upper Willamette SWCD)
(formerly the East Lane SWCD)
780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6436
Provides technical assistance in a wide variety of agricultural and natural resource areas and assists landowners in accessing federal and local funding programs.

Farm Services Agency (FSA)
780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443
Maintains agricultural program records and administers federal cost-share programs. Maintains up-to-date aerial photographs and slides of agricultural and forest lands.

Lane County Farmers' Market
55 East 8th Avenue
Eugene, OR 97401
(541) 687-6721
Local produce directly from farmers. Many experienced organic growers onsite.

McKenzie River Trust
1245 Pearl Street
Eugene, OR 97401
(541) 345-2799
mrt@mckenzieriver.org
www.mckenzieriver.org
Local, non-profit land conservancy that works with landowners in Lane and Douglas Counties to preserve their property. Employs several tools to help landowners protect lands critical to water quality and wildlife habitat.

Natural Resources Conservation Service (NRCS)
780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443
Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing conservation plans for federal programs such as the Conservation Reserve Program, Conservation Reserve Enhancement Program, the Environmental Quality Incentives Program, and the Wetlands Reserve Program. Makes technical determinations on wetlands and highly erodible lands.

Northwest Coalition for Alternatives to Pesticides (NCAP)
P.O. Box 1393
Eugene, OR 97440
(541) 344-5044
http://www.pesticide.org
info@pesticide.org
Works to protect people and the environment by advancing healthy solutions to pest problems. Has a library of over 15,000 articles, documents and books on pesticide issues, the health and environmental

ED_454-000322884 EPA-6822_012550

effects of pesticides, and alternative practices. Provides information on managing a specific pest problem or crop without the use of pesticides. Has water quality program and can provide information on protection of waterways and research on pesticide contamination of waterways.

Oregon Department of Agriculture (ODA)
635 Capitol St NE
Salem, OR 97301
Natural Resources Division: (503) 986-4700
Pesticides Division: (503) 986-4635
The Natural Resources Division is responsible for developing and implementing Management Area Plans and Rules across Oregon, the Confined Animal Feeding Operation Program, and for providing support to Oregon's SWCDs.

The Pesticides Division regulates the sale and use of pesticides; tests and licenses all users of restricted-use pesticides, is responsible for fertilizer registration, and investigates incidents of alleged pesticide misuse.

Oregon Department of Environmental Quality (DEQ)
165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838
Responsible for protecting Oregon's water and air quality, cleaning up spills and releases of hazardous materials, and managing the proper disposal of solid and hazardous wastes. Maintains a list of water quality limited streams and establishes Total Maximum Daily Loads for water quality limited waterbodies.

Oregon Department of Fish and Wildlife (ODFW)
Springfield Field Office
3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3515
http://www.dfw.state.or.us
Works with landowners to protect and enhance habitat for a variety of fish and wildlife species, manages recreational fishing and hunting programs, monitors fish and wildlife populations, conducts education and information programs, and administers wildlife habitat tax deferral program.

Oregon Department of Forestry (ODF)
Veneta office:
87950 Territorial HWY
Veneta, OR 97487
(541) 935-2283

Springfield office:
3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3588
http://www.odf.state.or.us
Implements Oregon forest practices laws, administers Oregon forestry property tax programs, provides forest management technical assistance to landowners, and administers or assists with several federal and local cost-sharing programs.

ED_454-000322884 EPA-6822_012551

Oregon Department of State Lands (DSL)
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
http://statelands.dsl.state.or.us
Administers Oregon fill and removal law and provides technical assistance to landowners.

Oregon State University Extension Service (OSU Extension Service)
783 Grant Street
Eugene, OR 97402
(541) 344-5859
http://extension.oregonstate.edu/lane
Offers educational programs, seminars, classes, tours, publications, and individual assistance to guide landowners in meeting natural resource management goals.

Oregon Tilth
260 SW Madison Avenue, Suite 106
Corvallis, OR 97333
(503) 378-0690
http://www.tilth.org
Oregon Tilth is the Northwest certifying agency for organic farms. Maintains a manual on acceptable practices and visits farms to determine compliance. Also publishes "In Good Tilth" and maintains a list of currently certified farmers.

Oregon Water Resources Department (WRD)
725 Summer Street NE, Suite A
Salem, OR 97301
(503) 986-0900
http://www.wrd.state.or.us
Provides information on streamflows and water rights, issues water rights, and monitors water use.

Oregon Watershed Enhancement Board (OWEB)
http://www.oweb.state.or.us
775 Summer St. NE, Suite 360
Salem, OR 97301-1290
(503) 986-0178
Provides funding for a variety of watershed enhancement, assessment, monitoring and educational activities. Provides support to watershed councils throughout Oregon.

ED_454-000322884 EPA-6822_012552

Watershed Councils
Bring diverse interests together to cooperatively monitor and address local watershed conditions. Collect watershed condition data, conduct education programs, and train and involve volunteers.

McKenzie Watershed Council
P.O. Box 70166
Springfield, OR 97475
(541) 687-9076
www.mckenziewc.org
coordinator@mckenziewc.org

Coast Fork Watershed Council
28 South 6th Street, Suite A
Cottage Grove, OR 97424
(541) 767-9717
www.coastfork.org

Middle Fork Watershed Council
P.O. Box 27
Lowell, OR 97452
(541) 937-9800
www.mfwwc.org
contact@mfwwc.org

Mohawk Watershed Partnership
P.O. Box 615
Marcola, OR 97454-0615
(541) 687-9076
mwp@epud.nethttp://www.mckenziewc.org/mohawkWSP.html

Lost Creek Watershed Group
PO Box 27
Lowell, OR 97452
(541) 937-3351
mfwwc@efn.org

ED_454-000322884 EPA-6822_012553

Appendix C: 2010 Water Quality Assessment List and Decision Matrix

"TMDL" means a TMDL has been established for the waterbody and approved by EPA, and is being implemented. The TMDL is the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. The water is considered Water Quality Limited until it meets the water quality standard.

"303(d) List" means the waterbody exceeds listing criteria and is placed on the 303(d) List.

"Potential concern" means data indicate a waterbody may typically meet water quality standards except under unusual circumstances (e.g. unusual weather circumstances) or in situations where toxics exceed levels of concern but do not exceed definitions used for the 303(d) List. In these cases, the waterbodies are identified as being of potential concern and the Department of Environmental Quality will seek more data to verify the assessment.

BACTERIA (CRITERIA: WATER CONTACT RECREATION)

TMDL Approved September 2006

DEQ has set the bacteria TMDL to protect human water contact recreation, the most sensitive beneficial use. Urban stormwater discharge and agricultural run-off are two potential sources of bacteria. The bacteria TMDL addresses the entire area.

DISSOLVED OXYGEN

TMDL Approved, 1996
Coast Fork Willamette River, River Mile (RM) 0 to 28.5

303(d) List	Season
Middle Fork Sub Basin:	
Anthony Creek, Mouth to RM 4.3	Oct. 1 – May 31
Anthony Creek, Mouth to RM 4.3	June 1 – Sept. 30
Lost Creek, Mouth to RM 14.7	Oct. 1 – May 31
Lost Creek, Mouth to RM 14.7	June 1 – Sept. 30
Coast Fork Sub Basin:	
Camas Swale Creek, Mouth to RM 9.4	Oct. 1 – May 31

TEMPERATURE (CRITERIA: REARING 64 F, SPAWNING 55 F, OR BULL TROUT 50 F)

DEQ set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Southern Willamette Valley Management Area. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities. There are separate temperature TMDLs for the mainstem Willamette, the McKenzie Subbasin, the Middle Fork Willamette Subbasing, and the Coast Fork Willamette Subbasin

ED_454-000322884 EPA-6822_012554

303(d) List (covered under the TMDL)	Season
McKenzie Sub Basin:	
Blue River-RM 0 to 15.5	Year Round
Budworm Creek, RM 0 to 3.1	Year Around
Camp Creek, RM 0 to 10.9	Year Around
Cartright Creek, RM 0 to 6.1	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Deer Creek, RM 0 to 2.6	Year Around
Duckpen Creek, RM 0 to 2.1	Year Around
Horse Creek, RM 0 to 14.2	Summer
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McGowan Creek, RM 0 to 5.7	Year Around
McKenzie River, RM 0 to 54.6	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Rebel Creek, RM 0 to 1.2	Year Around
Rush Creek, RM 0 to 2.4	Year Around
Seeley Creek, RM 0 to 2.4	Year Around
Shotgun Creek, RM 0 to 6.6	Year Around
South Fork McKenzie River, RM 0 to 4.5	Summer
Middle Fork Willamette:	
Anthony Creek, RM 0 to 4.3	Year Around
Bohemia Creek, RM 0 to 4.4	Year Around
Buckhead Creek, RM 0 to 3.6	Year Around
Chalk Creek, RM 0 to 4.8	Year Around
Christy Creek, RM 0 to 12	Year Around
Coal Creek, RM 0 to 8.9	Year Around
Coal Creek Trib., RM 0 to 2.2	Year Around
Eagle Creek, RM 0 to 5.3	Year Around
Fall Creek, RM 0 to 32.8	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Gold Creek, RM 0 to 5.1	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Guiley Creek, RM 0 to 4.7	Year Around
Hehe Creek, RM 0 to 6.6	Year Around
Hills Creek, RM 0 to 15.3	Year Around
Indian Creek, RM 0 to 4.3	Year Around
Little Fall Creek, RM 0 to 20.6	Year Around
Logan Creek, RM 0 to 3.6	Year Around
Lost Creek, RM 0 to 14.7	Year Around
McKinley Creek, RM 0 to 3.8	Year Around
Middle Creek, RM 0 to 3.8	Year Around
Middle Fork Willamette, RM 52.3 to 82.2	Year Around
Mike Creek, RM 0 to 2.2	Year Around
Monterica Creek, RM 0 to 2.3	Year Around
N. Fork, Middle Fork Willamette River, RM 0 to 28.3	Year Around
N. Fork Winberry Creek, RM 0 to 5.8	Year Around
Packard Creek, RM 0 to 5.2	Summer

ED_454-000322884 EPA-6822_012555

Portland Creek, RM 0 to 3	Summer
Salt Creek, RM 0 to 13.8	Year Around
Shortridge Creek, RM 0 to 2	Year Around
Snake Creek, RM 0 to 3.6	Year Around
South Fork Winberry Creek, RM 0 to 9.5	Year Around
Wall Creek, RM 0 to 6.6	Year Around
Winberry Creek, RM 0 to 8	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Summer
Coast Fork Willamette, RM 0 to 38.8	Year Around
King Creek, RM 0 to 3.2	Year Around
Laying Creek, RM 0 to 14.4	Year Around
Marten Creek, RM 0 to 3.4	Year Around
Mosby Creek, RM 0 to 21.2	Year Around
Row River, RM 0 to 20.8	Year Around
Sharps Creek, RM 0 to 15,2	Year Around

Potential Concern	**Season**
McKenzie Sub Basin:	
Augusta Creek, RM 0 to 7.1	Summer
Middle Fork Willamette:	
Salt Creek, South Fork, RM 0 to 6.6	Summer

METALS

Mercury TMDL

Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. The Mercury TMDL has a basin wide strategy for mercury reduction.

303(d) List	**Season**
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5 (Manganese)	Year Around
Mohawk River, RM 0 to 25.4 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Iron)	Year Around
Coast Fork Willamette River, RM 0 to 38.8 (Mercury)	Year Around
Cottage Grove Reservoir (Mercury)	Year Around
Dennis Creek, RM 0 to 1.4 (Mercury)	Year Around
Dorena Reservoir (Mercury)	Year Around

Potential Concern	
McKenzie Sub Basin:	
McKenzie RiverRM 0 to 83 (Arsenic)	
McKenzie River, RM 0 to 34.1 (Chromium)	Year Around

ED_454-000322884 EPA-6822_012556

McKenzie River, RM 0 to 34.1 (Copper)	Year Around
McKenzie River, RM 0 to 19.7 (Iron)	Year Around
McKenzie River, RM 0 to 34.1 (Manganese)	Year Around
McKenzie River, RM 0 to 34.1 (Nickel)	Year Around
South Fork McKenzie River, RM 0 to 36.3 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Manganese)	Year Around

FLOW MODIFICATION

303 (d) List	**Season**
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Undefined
Camp Creek, RM 0 to 10.8	Undefined
McKenzie River, RM 34.1 to 54.5	Undefined
South Form McKenzie River, RM 0 to 4.5	Undefined
Middle Fork Willamette:	
Fall Creek, RM 0 to 7 and 13 to 32.7	Undefined
Middle Fork Willamette River, RM 0 to 15.6 and 18.7 to 44.2	Undefined
Coast Fork Willamette:	
Coast Fork Willamett, RM 0 to 31.3	Undefined
Row River, RM 0 to 7.4	Undefined

HABITAT MODIFICATION

303 (d) List	**Season**
McKenzie Sub Basin:	
Mill Creek, RM 0 to 2.7	Undefined
Mohawk River, RM 0 to 25.4	Undefined
Middle Fork Willamette:	
Little Fall Creek, RM 0 to 20.6	Undefined
Simpson Creek, RM 0 to 5	Undefined
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Undefined
Mosby Creek, RM 0 to 21.2	Undefined
Sharps Creek, RM 0 to 12.5	Undefined

ED_454-000322884 EPA-6822_012557

AQUATIC WEEDS OR ALGAE

303 (d) List	Season
McKenzie Sub Basin:	
Blue River/Blue River Reservoir	Undefined
Middle Fork Willamette:	
Middle Fork Willamette/Dexter Reservoir	Undefined
Middle Fork Willamette/Hills Creek Lake	Undefined
Middle Fork Willamette/Lookout Point Lake	Undefined
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 31.3	Undefined
Row River/Dorena Lake	Undefined

NUTRIENTS

TMDLs Approved

Coast Fork Willamette-Mouth to Cottage Grove Reservoir (Phosphorus)
Coast Fork Willamette-Mouth to Cottage Grove Res. (Water-Ammonia)
Coast Fork Willamette, RM 0 to 31.3 (pH)

Potential Concern

McKenzie River, RM 73.4 to 84.8 (Phosphorus)

ALKALINITY

Potential Concern	Season
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McKenzie River, RM 0 to 84.8	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Parsons Creek, RM 0 to 6.9	Year Around
Rebel Creek, RM 0 to 4.4	Year Around
Roney Creek, RM 0 to 2.7	Year Around
Rush Creek, RM 0 to 2.4	Year Around
South Fork McKenzie River, RM 0 to 36.3	Year Around
Middle Fork Willamette:	
Black Creek, RM 0 to 13.6	Year Around
Eighth Creek, RM 0 to 2.7	Year Around
Furnish Creek, RM 0 to 5.2	Year Around

ED_454-000322884 EPA-6822_012558

Little Fall Creek, RM 0 to 20.6	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
North Fork Winberry Creek, RM 0 to 5.8	Year Around
Shady Creek, RM 0 to 1.7	Year Around
Timber Creek, RM 0 to 2.7	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 15.5	Year Around
Coast Fork Willamette River, RM 0 to 28.3	Year Around
Row River, RM 0 to 20.8	Year Around

BIOLOGICAL CRITERIA

Potential Concern	**Season**
McKenzie Sub Basin:	
Cash Creek, RM 0 to 6.1	Year Around
Hardy Creek, RM 0 to 4.1	Year Around
Middle Fork Willamette:	
Double Creek, RM 0 to 2.9	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
Salt Creek, RM 0 to 29.1	Year Around
Shady Creek, RM 0 to 1.7	Year Around

Mainstem Willamette Listings
Dioxin, Aldrin, DDE, DDT, Dieldrin, PCBs, and Iron

ED_454-000322884 EPA-6822_012559

Appendix D: Water Quality Parameters List and Affected Beneficial Uses

The following is a list of parameters used by the DEQ in establishing the 303(d) List and the beneficial uses of water impacted by these parameters. This is an abbreviated summary and does not contain detailed descriptions of the standards. Specific information about these standards can be found in the Oregon 303(d) List or in OAR 340-041-0445. Listed parameters in the Management Area are indicated in boxes.

Parameters

Aquatic Weeds or Algae
Standard – The development of fungi or other growths having a deleterious effect on stream bottoms, fish, or other aquatic life, or which are injurious to health, recreation, or industry shall not be allowed.
Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Livestock Watering, Public and Private Domestic Water Supply, Irrigation, Industrial Water Supply.

Bacteria
Standard - Fecal bacteria levels shall not exceed a 30-day log mean of 126 E. Coli organisms per 100 ml, based on a minimum of 5 samples and no single sample shall exceed 406 E. Coli organisms per 100 ml. Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing, or shellfish propagation, or otherwise injurious to public health, shall not be allowed.
Beneficial Uses Affected - Water Contact Recreation, Public and Private Domestic Water Supply, Livestock Watering.

Biological Criteria
Standard – Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Chlorophyll a
Standard – The following average Chlorophyll a values shall be used to identify waterbodies where phytoplankton may impair the recognized beneficial uses:
1. Natural lakes, which thermally stratify: 0.01 mg/l.
2. Natural lakes, which do not thermally stratify, reservoirs, rivers, and estuaries: 0.015 mg/l.
Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Water Supply.

Dissolved Oxygen
Standard - For waterbodies identified as salmonid spawning, dissolved oxygen must not be less than 11.0 mg/l and inter-gravel levels must not fall below 6 mg/l. For waterbodies supporting cold water aquatic life, dissolved oxygen must not fall below 8 mg/l. For waterbodies supporting cool water aquatic life, dissolved oxygen must not fall below 6.5 mg/l. For waterbodies supporting warm water aquatic life, dissolved oxygen must not be less than 5.5 mg/l.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

ED_454-000322884 EPA-6822_012560

Flow Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Habitat Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Nutrients
Standard - see standards for aesthetics, pH, dissolved oxygen, chlorophyll a, and aquatic weeds or algae.
Beneficial Uses Affected - Aesthetics or use identified under related parameters.

pH
Standard - pH shall not fall outside 6.5 to 8.5. The following exception applies: waters impounded by dams existing on January 1, 1996, which have pHs that exceed the criteria shall not be considered in violation of the standard if the Department of Environmental Quality determines that the exceedance would not occur without the impoundment and that all practicable measures have been taken to bring the pH in the impounded waters into compliance with the criteria.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Water Contact Recreation, Salmonid Spawning, Rearing, and Migration.

Sedimentation
Standard – The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Temperature
Standard - 64F for waterbodies with salmonid fish rearing and migration, 55F for waterbodies with salmonid fish spawning, 61F for core cold water habitat, and 50F for waterbodies with bull trout. Following a temperature TMDL, temperature water quality limited waters can not be warmed more than .3 degrees Celsius (.5 degrees F) by sources from anthropogenic heating.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Fish Spawning, Rearing, and Migration.

Total Dissolved Gas
Standard – The concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection shall not exceed 110 percent of saturation, and the liberation of dissolved gases, such as carbon dioxide, hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation or other reasonable uses made of such waters shall not be allowed.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Toxics
Standard - Toxic substances shall not be introduced above natural background levels in the waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bio-accumulate in aquatic life or

ED_454-000322884 EPA-6822_012561

wildlife to levels that adversely impact public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses. Standards for specific toxic substances may be viewed on the DEQ website at http://waterquality.deq.state.or.us/wq/wqrules/340Div41Tbl20.pdf.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Public, Private and Industrial Water Supply, Livestock Watering, Fishing, Irrigation, Water Contact Recreation.

Turbidity
Standard – No more than ten percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activities.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Aesthetics.

ED_454-000322884 EPA-6822_012562

ED_454-000322884 EPA-6822_012563

Appendix E: Pesticide Use in Oregon

Oregon has strict laws and regulations related to pesticide use, storage, and reporting. All pesticide users are required to apply and store pesticides according to the label. Users of restricted-use pesticides are required to obtain certification from the ODA. Improper application and storage of pesticides may lead to surface or groundwater quality problems.

The following are prohibited under ORS 634.372:

634.372 Prohibited acts. No person shall:
(1) Make false or misleading claims through any media, relating to the effect of pesticides or application methods to be utilized.
(2) As a pesticide applicator or operator, intentionally or willfully apply or use a worthless pesticide or any pesticide inconsistent with its labeling, or as a pesticide consultant or dealer, recommend or distribute such pesticides.
(3) Operate a faulty or unsafe pesticide spray apparatus, aircraft or other application device or equipment.
(4) Perform pesticide application activities in a faulty, careless or negligent manner.
(5) Refuse or neglect to prepare and maintain records required to be kept by the provisions of this chapter.
(6) Make false, misleading or fraudulent records, reports or application forms required by the provisions of this chapter.
(7) Operate pesticide applicators' apparatus, machinery or equipment without a licensed pesticide applicator or certified private applicator performing the actual application, or supervising such application if such is performed by a pesticide trainee. This prohibition does not apply to the operation of tractors, trucks or other vehicular equipment used only under the supervision of a certified private applicator.
(8) As a pesticide applicator, work or engage in the application of any classes of pesticides without first obtaining and maintaining a pesticide applicator's license, or apply pesticides, which are not specifically authorized by such license.
(9) As a pesticide operator, engage in the business of, or represent or advertise as being in the business of, applying pesticides upon the land or property of another, without first obtaining and maintaining a pesticide operator's license, nor shall such person engage in a class of pesticide application business which is not specifically authorized by license issued by the State Department of Agriculture. Further, no such person shall employ or use any person to apply or spray pesticides who is not a licensed pesticide applicator or pesticide trainee.
(10) As a pesticide trainee, work or engage in the application of any class of pesticides without first obtaining and maintaining a pesticide trainee's certificate and is otherwise in compliance with the provisions of this chapter.
(11) Act as, or purport to be, a pesticide dealer or advertise as such without first obtaining and maintaining a pesticide dealer's license.
(12) Act as, or purport to be, a pesticide consultant without first obtaining and maintaining a pesticide consultant's license.
(13) Apply any pesticide classified as a restricted-use or highly toxic pesticide to agricultural, horticultural or forest crops on land owned or leased by the person without first obtaining and maintaining a private applicator certificate.
(14) As a person described in ORS 634.106 (6), use power-driven pesticide application equipment or devices (use hand or backpack types only), or use or apply any pesticide other than those prescribed by the ODA.
(15) Deliver, distribute, sell or offer for sale any pesticide which is misbranded.
(16) Formulate, deliver, distribute, sell or offer for sale any pesticide, which is adulterated.
(17) Formulate, deliver, distribute, sell or offer for sale any pesticide, which has not been registered as required by ORS 634.016.

ED_454-000322884 EPA-6822_012564

(18) Formulate, deliver, distribute, sell or offer for sale any powdered pesticide containing arsenic or any highly toxic fluoride which is not distinctly colored.
(19) Distribute, sell or offer for sale any pesticide except in the manufacturer's original unbroken package.
(20) Make application of pesticides, by aircraft or otherwise, within a protected or restricted area without first obtaining a permit for such application from the committee of the protected or restricted area in which the application is to be made, nor shall such person make such application contrary to the conditions or terms of the permit so issued.
(21) Use isopropyl ester of 2,4-D, or any other ester of equal or higher volatility with regard to plant damage as determined by the ODA, without first obtaining a permit for such use as provided in ORS 634.322 (10).
(22) Sell, use or remove any pesticide or device subjected to a "stop sale, use or removal" order until the pesticide or device has been released therefrom as provided in ORS 634.322 (3).
(23) Fail to comply with any provision or requirement of sections 2 to 9, chapter 1059, Oregon Laws 1999, or rules adopted thereunder. [1973 c.341 s.34; 1987 c.158 s.121; 1995 c.360 s.2; 1999 c.1059 s.14]

For complete laws and regulations related to pesticides, please consult the ODA website at http://www.oda.state.or.us/pesticide/info.html or an updated copy of the ORSs and Oregon Administrative Rules.

For more detailed recommendations on pesticide use and control of pests and disease, contact the ODA Pesticides Division, Oregon State University Extension Service, or a qualified consultant.

ED_454-000322884 EPA-6822_012565

Appendix F: Conservation Funding Programs

The following is a list of some conservation funding programs available to landowners and organizations in Oregon. For more information, please refer to the contact agencies for each program. Additional programs may become available after the publication of this document. For more current information, please contact one of the organizations listed below.

Program	General Description	Contact
Conservation Easements	Deed restrictions that protect specific aspects of land for water quality and/or habitat benefits. Easements are perpetual, flexible documents that are held by private conservation organizations, who are charged with ensuring that what is protected stays protected. Management responsibilities of land are shared with landowner. Donated easements can provide tax benefits. Easements can also be sold.	American Farmland Trust, McKenzie River Trust, Trust for Public Land
Conservation Reserve Enhancement Program (CREP)	Provides annual rent to landowners who enroll agricultural lands along streams. Also cost-shares conservation practices such as riparian tree planting, livestock watering facilities, and riparian fencing.	NRCS, SWCDs, Oregon Department of Forestry
Conservation Reserve Program (CRP)	Competitive CRP provides annual rent to landowners who enroll highly erodible lands. Continuous CRP provides annual rent to landowners who enroll agricultural lands along seasonal or perennial streams. Also cost-shares conservation practices such as riparian plantings.	NRCS, SWCDs
Conservation Stewardship Program (CSP)	Provides cost-share and incentive payments to landowners who have attained a certain level of stewardship and are willing to implement additional conservation practices.	NR CS, SWCDs
Emergency Watershed Protection Program (EWP)	Available through the USDA-NRCS. Provides federal funds for emergency protection measures to safeguard lives and property from floods and the products of erosion created by natural disasters that cause a sudden impairment to a watershed.	NRCS, SWCDs

ED_454-000322884 EPA-6822_012566

Program	General Description	Contact
Environmental Protection Agency Section 319 Grants	Fund projects that improve watershed functions and protect the quality of surface and groundwater, including restoration and education projects.	DEQ, SWCDs, Watershed Councils
Environmental Quality Incentives Program (EQIP).	Cost-shares water quality and wildlife habitat improvement activities, including conservation tillage, nutrient and manure management, fish habitat improvements, and riparian plantings.	NRCS, SWCDs
Farm and Ranchland Protection Program (FRPP)	Cost-shares purchases of agricultural conservation easements to protect agricultural land from development.	NRCS, SWCDs
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	IRS
Fee Title Acquisition	In some situations, private land conservancies can acquire land for a fee from landowners. Generally, land conservancies purchase property in relatively good ecological health, and buy the property at appraised value.	McKenzie River Trust, The Nature Conservancy, SWCDs
Forestry Incentives Program (FIP)	Provides cost sharing for several forest stand improvement practices.	NRCS, SWCDs, Oregon Department of Forestry
Forest Resource Trust	State assistance up to 100 percent of the costs to convert non-stocked forestland to timber stands. Available to non-industrial private landowners.	Oregon Department of Forestry
Grassland Reserve Program (GRP)	Provides incentives to landowners to protect and restore pastureland, rangeland, and certain other grasslands.	NRCS, FSA, SWCD
Landowner Incentive Program (LIP)	Provides funds to enhance existing incentive programs for fish and wildlife habitat improvements.	U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife
Oregon Watershed Enhancement Board (OWEB).	Provides grants for a variety of restoration, assessment, monitoring, and education projects. 25 percent match requirement on all grants.	SWCDs, Watershed Councils, OWEB
Oregon Watershed Enhancement Board Small Grants Program	Provides grants up to $10,000 for watershed restoration projects. 25 percent match requirement.	SWCDs, Watershed Councils, OWE B
Partners for Wildlife Program.	Provides financial and technical assistance to private and non-federal landowners to restore and improve wetlands, riparian areas, and upland	U.S. Fish and Wildlife Service, NRCS, SWCDs

ED_454-000322884 EPA-6822_012567

Program	General Description	Contact
	habitats in partnership with the U.S. Fish and Wildlife Service and other cooperating groups.	
Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and management projects. Projects should reduce erosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	NRCS, SWCDs.
Resource Conservation & Development (RC & D) Grants	Provides assistance to organizations within RC & D areas in accessing and managing grants.	Resource Conservation and Development
State Forestation Tax Credit	Provides for reforestation of under-productive forestland not covered under the Oregon Forest Practices Act. Situations include brush and pasture conversions, fire damage areas, and insect and disease areas.	Oregon Department of Forestry
State Tax Credit for Fish Habitat Improvements	Provides tax credit for part of the costs of voluntary fish habitat improvements and required fish screening devices.	Oregon Department of Fish and Wildlife
Stewardship Incentive Program (SIP).	Cost-sharing program for landowners to protect and enhance forest resources. Eligible practices include tree planting, site preparation, pre-commercial thinning, and wildlife habitat improvements.	NRCS, SWCDs, Oregon Department of Forestry
Wetlands Reserve Program (WRP)	Provides cost sharing to landowners who restore wetlands on agricultural lands.	NRCS, SWCDs
Wildlife Habitat Incentives Program	Provides cost-share for wildlife habitat enhancement activities.	NRCS, SWCDs
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop a wildlife management plan with the approval of the Oregon Department of Fish and Wildlife.	Oregon Department of Fish and Wildlife, SWCDs, NRCS.

ED_454-000322884 EPA-6822_012568

ED_454-000322884 EPA-6822_012569

Appendix G: Revised Universal Soil Loss Equation (RUSLE)

The RUSLE is a model that estimates the average annual level of soil loss on a field due to sheet and rill erosion. The sheet erosion process occurs when rainfall and runoff water combine to erode a relatively uniform layer of soil. Runoff may also erode soil to form numerous small channels a few inches deep, or rills.

The equation for estimating annual soil loss is:

A = RKLSCP

where:

A = average annual soil loss in tons per acre;

R = rainfall and runoff intensity index by geographic location;

K = soil erodibility factor;

LS = topographic factor, L is for slope length and S is for slope percent;

C = cropping factor, the ratio of soil loss for the given conditions to that from a clean-cultivated field;

P = conservation practice factor, or the ratio of soil loss for a given practice to that for purely up-and-down-the-slope farming.

Each soil type has a soil loss tolerance factor, or T. If the annual soil loss exceeds the soil loss tolerance factor, the soil is eroding at an unsustainable rate; in other words, the soil quality is degrading. Natural Resource Conservation Service and SWCD offices have soil surveys to help landowners determine soil types, and also provide technical assistance to help landowners estimate the rate of soil loss on their property. For more information, contact the local NRCS and SWCD office.

ED_454-000322884 EPA-6822_012570

ED_454-000322884 EPA-6822_012571

Appendix H: ORS 468B.025 and 468B.050

ORS 468B.025 is an existing statute that was developed to address water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Plans and Rules in the state.

ORS 468B.025(1) states:

...no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

ORS 468B.050 identifies the conditions when a permit is required. In agriculture, under state rules, these are referred to as Confined Animal Feeding Operations and are operations that confine animals on prepared surfaces to support animals in wet weather, have wastewater treatment works, discharge any wastes into waters of the state, or meet the federal definition of a Concentrated Animal Feeding Operation (40 CFR § 122.23).

Definitions:

"Pollution" has the meaning given in ORS 468B.005(3) which states: "such alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof."

"Wastes" has the meaning given in ORS 468B.005(7) which states: sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances which will or may cause pollution or tend to cause pollution of any waters of the state.

Other substances that will or may cause pollution include commercial fertilizers, soil amendments, composts, animal wastes, and vegetative materials.

ED_454-000322884 EPA-6822_012572

Appendix I: References on Water Quality Improvement Practices for Agricultural Landowners

Below is a list of selected references with more specific information on water quality and natural resources improvement practices. Copies of many of these publications are available from the local Oregon State University Extension office or local SWCD. Underlined publications are also available online on the publishing agency's website.

General Water Quality Protection

Adams, E.B. 1992. Farming practices for groundwater protection. Washington State University, Spokane, Washington.

Hermanson, R.E. 1994. Care and feeding of septic tanks. Washington State University, Spokane, Washington.

Hirschi, M. et al. 1994. 50 ways farmers can protect their groundwater. University of Illinois, Urbana, Illinois.

Hirschi, M., et al. 1997. 60 ways farmers can protect surface water. University of Illinois, Urbana, Illinois.

Ko, L. 1999. Tips on land and water management for small acreages in Oregon. Oregon Association of Conservation Districts, Portland, Oregon.

U.S. Department of Agriculture NRCS. 1998. National Handbook of Conservation Practices. U.S. Department of Agriculture NRCS, Portland, Oregon.

Riparian Areas and Streams

Adams, E.B. 1994. Riparian Grazing. Washington State University, Spokane, Washington.

Darris, D. and S.M. Lambert. 1993. Native willow varieties for the Pacific Northwest. U.S. Department of Agriculture Soil Conservation Service, Corvallis Plant Materials Center, Corvallis, Oregon.

Nash, E. and T. Mikalsen, eds. 1994. Guidelines for streambank restoration. Georgia Soil and Water Commission, Atlanta, Georgia.

South Santiam Watershed Council. 1998. Guide for using Willamette Valley native plants along your stream. Linn SWCD, Tangent, Oregon.

Nutrient and Manure Management

Godwin, D. and J.A. Moore. 1997. Manure management in small farm livestock operations: protecting surface and groundwater. Oregon State University, Corvallis, Oregon.

Hart, J. 1995. How to take a soil sample...and why. Oregon State University, Corvallis, Oregon.

Hart, J. 1999. Analytical laboratories serving Oregon. Oregon State University, Corvallis, Oregon.

Marx, E.S., J. Hart, and R.G. Stevens. 1999. Soil Test Interpretation Guide. Oregon State University, Corvallis, Oregon.

ED_454-000322884 EPA-6822_012573

Moore, J. and T. Willrich. 1993. Manure management practices to reduce water pollution. Oregon State University, Corvallis, Oregon.

Sattell, R. et al. 1999. Nitrogen scavenging: using cover crops to reduce nitrate leaching in western Oregon. Oregon State University, Corvallis, Oregon.

Grazing and Pasture Management

Ursander, D. et al. 1997. Pastures for Profit: a guide to rotational grazing. University of Wisconsin, Madison, Wisconsin.

Erosion and Sediment Control

Hansen, H. and W. Trimmer. 1997. Irrigation runoff control strategies. Oregon State University, Corvallis, Oregon.

Trimmer, W. and H. Hansen. 1994. Irrigation scheduling. Oregon State University, Corvallis, Oregon.

Pesticide Management and Integrated Pest Management

Publishers:

	Acres USA	Rodale Press
	P.O. Box 91299	33 East Minor St.
	Austin, TX 78709	Emmaus, PA 18098
	(512) 892-4400	(610) 967-5171
	info@acresusa.com	info@rodale.com

Kerle, E.A., J.J. Jenkins, and P.A. Vogue. 1996. Understanding pesticide persistence and mobility for groundwater and surface water protection. Oregon State University, Corvallis, Oregon.

Menzies, G., C.B. MacConnell, and D. Havens. 1994. Integrated pest management: effective options for farmers.

ED_454-000322884 EPA-6822_012574

Appendix J: Where Does the 25-year Storm Event Requirement come from in the Riparian Characteristic to Achieve?

The 25-year, 24-hour storm is used because the ability to dissipate stream energy and maintain streambank integrity after this level of storm intensity is one of the criteria for a riparian area to be in Proper Functioning Condition.

The Proper Functioning Condition assessment process is a way to determine how well the physical processes are functioning in a riparian or wetland area. Once a riparian-wetland area reaches Proper Functioning Condition, it is in a state of resiliency that will allow the system to hold together during a 25 to 30 year flow event. In other words, the riparian area can resist major structural changes brought about by the storm event, and can recover in time for future events. Riparian areas that have not yet achieved PFC are classified as either functioning at-risk, nonfunctional, or unknown. A functioning at-risk area would likely experience major structural changes, such as excessive bank erosion and loss of riparian vegetation, in a 25 year, 24-hour flood event.

To be in compliance with the proposed riparian Area Rule OAR 603-095-2140 (1) (b) a landowner would need to cease activities that prevent the growth and establishment of vegetation that would help move a riparian area toward providing functions necessary for a stream to withstand the flows resulting from a 25-year storm. For example, if a landowner plowed a riparian area and destroyed the riparian vegetation, he or she would clearly be out of compliance with the rule. If a landowner stopped tilling and allowed vegetation to come in, they would be in compliance with the rule even if the riparian area were not yet able to withstand a 25-year, 24-hour storm event. If a landowner allowed grazing in a riparian area but allowed the area to move toward providing this level of riparian function, he or she would be in compliance with the rule.

For the Southern Willamette Valley, 25-year, 24-hour storm events range from 4.0 to 6.5 inches of rain.

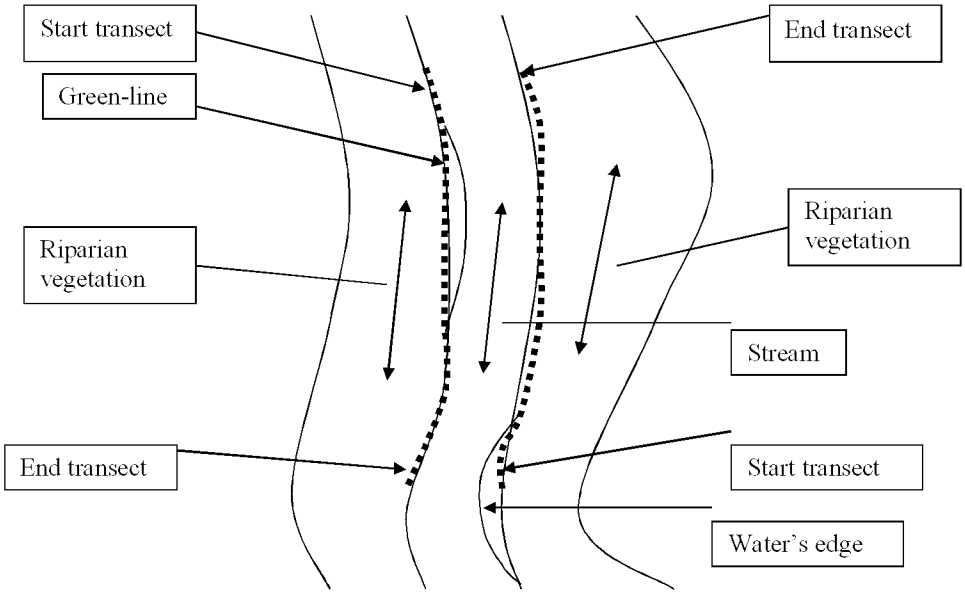
How would compliance with the riparian Characteristic to Achieve be determined?

An inspector would first consider site capability when evaluating a riparian area for compliance with the rule. In other words, the inspector would first determine the kinds and amounts of vegetation the site could produce given legacy conditions (conditions caused by past management or events), such as riprap, and natural limiting conditions, such as soil type. The inspector would also determine if the site were capable of producing vegetation stable enough to withstand flows following a 25-year, 24-hour storm event. If the site is capable of providing this function, the inspector would then determine if the site is either moving toward providing the function or if there is already enough vegetation to adequately protect the streambank. In both situations, the site would likely be in compliance.

If the inspector determined the site was probably out of compliance using the previous criteria, he or she would conduct a green line transect along the stream (Figure 1) and document the ground cover along the transect. The main criteria for noncompliance would be a prevalence of bare ground throughout the riparian area, limited vegetation indicating little to no root mass below-ground, and evidence of bank slumping or sediment runoff into the stream. Also, the problem would clearly have to be caused by agricultural activities.

ED_454-000322884 EPA-6822_012575

Figure 1. A green-line transect samples the first line of green vegetation from the water's edge. The green-line is the line nearest to the stream where perennial vegetation is first encountered.



Appendix K: Gettings Creek Priority Area Action Plan

Gettings Creek Priority Area: Action Plan
For the Southern Willamette Ag Water Quality management Area
Upper Willamette SWCD
2013 – 2015

A. Description of Watershed:

Gettings creek is a small perennial stream that is a tributary to the Coast Fork Willamette River. The Gettings Creek watershed is located on the east side of I-5 at exit 173 north of Cottage Grove OR. The watershed is approximately 10,000 acres in size with land uses consisting of 60% forest, 20% rural residential, and 20% agriculture. Agriculture in the watershed is mainly Cattle/Hay production and small acreage livestock producers.

B. Basis for Selection of Focus Area:

In 2011, the Upper Willamette SWCD worked with the ODA regional planner to develop a list of potential 6th field priority area sites. A meeting was held with watershed council representatives from the McKenzie, Middle Fork, and Coast Fork watershed councils to determine potential sites. Criteria for selection consisted of size of area, land use characteristics, water quality monitoring data, demographics of the area, parameters of concern, and aerial photos review. At this meeting 3 sites were selected to move forward to on the ground assessment of each site. From site assessment information, Gettings Creek was chosen as the priority area for the Southern Willamette Ag water quality management plan area.

C. Water Quality Parameters of Concern:

Gettings Creek is listed on the 303(d) list for Temperature and E.coli. In 2009 and 2010 the Coast Fork Watershed council conducted water quality monitoring at two locations in the lower Gettings Creek tributary. The main concern was with E.coli levels at the downstream sampling site. The state standard for E. coli was exceeded in 54% of the samples taken. In windshield evaluations much of the lower reach of the stream has no exclusion of livestock to the stream, and is lacking in riparian vegetation along a majority of the stream. Evaluation for temperature will be conducted using riparian vegetation as a surrogate. The Upper Willamette SWCD shall work with landowners to increase riparian vegetation along the stream and to install exclusion fence to eliminate livestock presence in the stream.

D. Description of Assessment Method(s):

Stream Temperature will be evaluated using riparian vegetation condition as a surrogate. Arial photo interpretation and field verification will be used to evaluate riparian vegetation condition and to determine if the vegetation is adequate to provide the functions as identified in the Area Plan. The Gettings Creek Sub-watershed riparian classification will have four categories related to riparian vegetation.

- **Class I** – Forest or no perennial streams present.
- **Class II**- Agricultural activities appear to be preventing riparian vegetation from achieving site capability.
- **Class III** - Agricultural activities are not impacting or are no longer impacting riparian vegetation, but site capability is not being met.
- **Class IV**- Site capability vegetation appears to be present in agricultural areas.

ED_454-000322884 EPA-6822_012577

Evaluation for E. coli will be conducted using presence of livestock an proximity to either seasonal or perennial streams as an initial surrogate. Bacteria classification will have four categories related to potential for bacteria to enter the waters of the state.

- **Class I** – Forest or non-agricultural lands.
- **Class II**- Agricultural activity are likely causing discharge of bacteria into waters of the state.
- **Class III** – Agricultural activities are not present on the property.
- **Class IV** – Agricultural properties have no potential for run-off of E. coli.

II. Objectives:
A). Increase percent site capable vegetation in riparian areas adjacent to Agricultural land by 20%.
B). Decrease number of landowners feeding livestock within the active floodplain by 25%

III. Implementation activities and timeline:
The following is a summary of implementation activities conducted during the last biennium in the Gettings Creek Priority Area. Work by the District is continuing by implementing three projects with landowners during the 2013-2015 biennium.

Quarter #	Quarter ending	Activity	Results	Notes
1	Sept 2011	Develop map of priority area including ownership, land use, riparian condition analysis.	Used map to prioritize landowner recruitment. Completes Q. 1	
	Sept. 2011	Validate map with local staff and road surveys.	Completes Q. 1	
	Sept 2011	Develop contact list of all landowners and rural residents in priority area.	Completes Q. 2	
2	Dec 2011	Contact all agricultural and rural residential landowners with information on the AgWQ plan and	Sent out 3 mailings to all landowners within priority area. (90 mailings each)	

ED_454-000322884 EPA-6822_012578

		rules.		
	Dec 2011	Targeted workshop for landowners regarding practices used in addressing the concerns	Conducted landowner workshop in Cottage Grove. 6 landowners attended.	
	Dec 2011	Inventory and site assessment with 3 landowners.	Conducted two assessments with landowners on a voluntary basis.	
3	March 2012	Target workshop on management of riparian areas	Due to poor turnout for previous workshop. Second workshop shall be held at landowner property at later date.	
4	June 2012	Inventory and site assessment with 10 landowners.	Conducted site assessments for four landowners.	These are landowners who voluntarily contacted the SWCD
5	Sept 2012	Contact remaining priority landowners and offer tech. assistance.	Sent additional mailing to all landowners.	
6	Dec 2012	Seek funds (OWEB etc) for landowners to implement AgWQ project	Submitted small grant project, approved for implementation. Submitted large OWEB grant for riparian work.	Submitted a large Grant application to OWEB to riparian enhancement work on main Gettings Creek, grant was not funded.
7	March 2013	Worked with 3 landowners to implement projects		
8	June 2013	Implement projects with five landowners	Working with 3 landowners in priority area. Provide quantitative results to ODA	Submitted small grant application that was approved for riparian and upland activites.

This project is not completed, projects have been approved for funding and implementation shall be conducted during the 2013 – 2015 biennium upon available funding for projects

Quarter #	Quarter ending	Activities	Results	Notes

ED_454-000322884 EPA-6822_012579

1	Sept 2013	Implement landowner projects, continue recruitment of landowners	Complete 3 on-going landowner projects.	Due to lack of available funding the large OWEB grant application submitted by the District for the Harrold property was rejected. District staff has completed one (1) water quality project during this quarter addressing inputs from livestock at the headwaters of Gettings Creek. Staff has started development of a second project addressing livestock concerns adjacent to Gettings Creek and is working with a third landowner to develop a project that will improve riparian vegetation, exclude livestock from the near stream area, and utilize rainwater harvesting for off-stream watering for livestock.
2	Dec 2013	Same as above	continue work with recruited landowners to implement projects. To date District staff has developed 3 site plans with landowners within the priority area. Two will/have received funding , one has not.	**Completed small grant project located at headwaters of North Gettings Creek. Practices include: Composting facility for livestock waste, heavy use protection, riparian enhancement of**

ED_454-000322884 EPA-6822_012580

				150 feet of stream, and exclusion fence along the riparian. Total number of effected acres addressed by project 2 Developed small grant project with another landowner adjacent to North Gettings Creek. Practices include composting facility, heavy use protection, roof runoff. This project is under review for approval and will begin when funding is in place. Total number of acres effected 3.
3	March 2014	Assist landowners in implementing projects	Due to funding issues one project has been delayed and the other listed above is waiting for dry weather to start excavation for practices.	Developed and received approval for small grant for livestock operation on North gettings creek. Planned practices include manure composting facility, heavy use protection, roof-run-off, riparian enhancement of 200 ft. of stream and exclusion fence. During this work met with second landowner adjacent to project location. Started development of

ED_454-000322884 EPA-6822_012581

				plan with second landowner. Practices include riparian enhancement, 400 ft. of stream, manure management, heavy use protection. Funding for this project is being sought.
4	June 2014	Conduct workshop at participating landowners property for all landowners in priority area	Recruit 7 landowners to participate in project work.	Received funding approval for second project application $ 10,000.00. Begin development of third small project. Made visit to large landowner project implemented by landowner on his own. Practices included use exclusion and planned enhancement for winter of riparian. Scheduled tour of work being conducted in priority area. Met with large landowner to discuss resubmitting grant proposal for riparian enhancement along bottom of Gettings Creek watershed. Have started initial development of proposal.
5, 6, 7, 8	June 2015	Complete		Conducted

ED_454-000322884 EPA-6822_012582

		additional project work with landowners. Provide results to ODA.		**landowner site visit on north Gettings creek landowner interested in conducting riparian project. Began implementation of practices for landowner project which include manure mgt, heavy use protection, grassed waterway. Conducted tour of two project sites in the priority Area. 12 attendees toured two farms and viewed practices of manure mgt, rotational grazing, irrigation water mgmt., heavy use protection and riparian enhancement.**

IV. Pre and Post-implementation Assessments:

	Percent of stream miles within focus area			
	2013	**2015**		
Class I	**0**	**0**		
Class II	**44,723**	**39623**		
Class III	**N/A**	**N/A**		
Class IV	**8,131**	**8,131**		

For the biennium 2011 – 2013 we, since implementation has not yet started we are providing potential changes to occur during this biennium.

- Percent of streams in class I increased by 0% because this area is under the Forest Practices Act.
- Percent of streams in class II decreased by 5 %

B. Implementation Summary:

ED_454-000322884 EPA-6822_012583

Number of landowners contacted by mail: 0 no mailings were distributed during this quarter.
Number of landowners contacted by phone: 3
Number of landowners with proposed projects: 1
Stream miles with exclusion fence: .4 miles
Stream miles of riparian restoration: .3 miles
Number of Grants received: 1
Estimated cost of grants: $10,000

ED_454-000322884 EPA-6822_012584